

Burden of Diabetes in South Carolina 2003



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Table of Contents

ACKNOWLEDGEMENTS	I
TABLE OF CONTENTS	II
LIST OF TABLES	IV
LIST OF FIGURES	V
ACRONYMS	VIII
EXECUTIVE SUMMARY	1
INTRODUCTION.....	4
METHODS	4
Part I: The Burden of Diabetes in South Carolina	5
Chapter One: Demographics and Access to Health Care	5
Chapter Two: Risk Factors	5
Chapter Three: Morbidity	5
Chapter Four: Mortality	6
Part II: Diabetes Initiative of South Carolina Strategic Plan Progress Report.....	6
Chapter One: Diabetes Initiative of South Carolina	6
Chapter Two: Diabetes Data Resources	6
PART I: BURDEN OF DIABETES IN SOUTH CAROLINA.....	7
Chapter One Demographics and Access to Health Care	7
Demographics	7
Urban VS Rural.....	8
The Uninsured in South Carolina	9
Health Professional Shortages	10
Other Health Professionals	12
Diabetes Programs	13
Summary	14
Chapter Two Risk Factors	16
Risk Factors in the General Population	16
Summary	24
Chapter Three Morbidity.....	26
Introduction.....	26
Prevalence	26
Hospital Discharges for Diabetes.....	27
Summary	38
Chapter Four Mortality	40
Introduction.....	40
Mortality Rates.....	40
Summary	41

PART II DIABETES INITIATIVE OF SOUTH CAROLINA STRATEGIC PLAN PROGRESS REPORT	43
Chapter One Progress On Goals	43
DSC Diabetes Center Council	43
DSC Outreach Council	43
DSC Surveillance Council	44
DSC Strategic Plan	44
DSC Long Range Plan Goals and Aims	45
Chapter Two Data Resources	46
Statewide Agencies that Provide and Interpret Data for Use in Monitoring the Burden of Diabetes.....	46
Internet Sites for National Diabetes Agencies and Organizations.....	49
Summary	49

List of Tables

Table 1. Population Distribution as of 2000 Census.....	7
Table 2. Physician Specialties most involved in Diabetes Care in South Carolina.....	11
Table 3. Number of Other Health Professionals, SC	12
Table 4. Prevalence of Hypertension in South Carolina, 1994-1997 and 2000-2001	20
Table 5. Prevalence of High Cholesterol in South Carolina 1994-1997 and 2000-2001	20

List of Figures

Figure 1a. South Carolina Population 1990 Racial/Ethnic Distribution.....	7
Figure 1b. South Carolina Population 2000 Racial/Ethnic Distribution.....	7
Figure 2. Trends in Race/Ethnic Populations 1980-2000	8
Figure 3. Age Distribution	8
Figure 4. Urban, Rural and Very Rural Counties in South Carolina	8
Figure 5. South Carolina Health Professional Shortage Areas, by County 2002	10
Figure 6. Physicians Employed in South Carolina, 2002	12
Figure 7. Average Number of CDEs in South Carolina 2002	13
Figure 8. Pharmacists Employed in South Carolina, 2000	13
Figure 9. Diabetes Programs in South Carolina, 2001.....	14
Figure 10. South Carolina DPCP Diabetes Coalitions.....	14
Figure 11. Prevalence of Overweight among Adults by Race-Sex, SC, 1990-2001	16
Figure 12. Prevalence of Overweight among Adults, SC, 2001	16
Figure 13. Prevalence of Physical Inactivity among Adults by Race-Sex, SC, 1990-2000	17
Figure 14. Prevalence of Physical Inactivity among Adult South Carolinians, 2000.....	17
Figure 15. Prevalence of Consuming Fruits and Vegetables Fewer Than 5-A-Day among Adults by Race-Sex, SC, 1990-2000.....	18
Figure 16. Prevalence of Consuming Fruits and Vegetables Less than 5-A-Day among Adults South Carolinians, 2000.....	18
Figure 17. Prevalence of Current Cigarette Smoking among Adults with Diabetes by Race-Sex, SC, 1990-2001	18
Figure 18. Prevalence of Current Cigarette Smoking among Adults, SC, 2001	19
Figure 19. Age-Specific Prevalence of Major Behavioral Risk Factors among Adults, SC, 2000	19
Figure 20. Prevalence of Taking Insulin or Diabetes Pills Among People with Diabetes, SC, 2000-2001.....	20
Figure 21. Prevalence of Taking Insulin and Diabetes Pills by Age among People with Diabetes, SC, 2000-2001.....	21
Figure 22. Prevalence of Having Blood Glucose Checked among People with Diabetes by Race, Sex, SC, 2000-2001.....	21
Figure 23. Prevalence of Having HbA1c Checked by Number Tests among People with Diabetes, SC, 2000-2001	22
Figure 24. Prevalence of Having Eyes Examined among People with Diabetes by Race-Sex, SC, 2000-2001.....	22
Figure 25. Prevalence of Eyes Being Affected by Diabetes among People with Diabetes, SC, 2000-2001.....	22
Figure 26. Prevalence of Having Taken a Course for Managing Diabetes among People with Diabetes, SC, 2000-2001.....	23
Figure 27. Prevalence of Receiving Flu Shot in Past 12 Months and Ever Received Pneumonia Vaccine among People with Diabetes, SC, 2000-2001.....	23
Figure 28. Prevalence of Having Feet Checked by a Health Professional in the Last Year among People with Diabetes, SC, 2000-2001.....	24

Figure 29. Prevalence of Self-Checking Feet for Sores or Irritations among People with Diabetes, SC, 2000-2001.	24
Figure 30. Prevalence of Seeing a Health Professional for Diabetes in Past Year, SC, 2000-2001.	24
Figure 31. Prevalence of Self-Reported Diabetes by Race-Sex, SC 1988-2001.	26
Figure 32. Prevalence of Self-Reported Diabetes among Adults by Age, SC< 1990-2001.	27
Figure 33. Age of Diagnosis of Diabetes among People with Diabetes, SC, 2000-2001.	27
Figure 34. Prevalence of Diabetes among Adults, SC, 2001.	27
Figure 35. Proportion of Hospitalizations with Diabetes of All Hospitalizations by Race-Age.	28
Figure 36. Total Number of Hospitalizations for Diabetes as the Primary Diagnosis, SC, 1987-2001.	28
Figure 37. Number of Hospital Discharges with Diabetes by Age, SC, 1997 and 2001.	28
Figure 38. Rate of Hospitalizations with Diabetes as Primary or Secondary Diagnosis.	29
Figure 39. Age Standardized Rate of Hospitalizations for Diabetes, (Primary Diagnosis), SC, 2001.	29
Figure 40. Total Hospital Charges for Hospitalizations for Diabetes as the Primary Diagnosis, SC, 1990-2001.	29
Figure 41. Total Charges for Hospitalization among Patients with Diabetes by Race-Sex, 1987, 1997, and 2001*.	30
Figure 42. Change in Average Hospital Charge for Diabetes as Primary Diagnosis by Age, SC, 1991-2001*.	30
Figure 43. Sources of Payment for Hospitalization among Patients with Diabetes as the Primary Diagnosis, SC, 2001.	30
Figure 44. Total Length of Hospital Stay for Patients with Diabetes as the Primary Diagnosis, 1990-2001.	31
Figure 45. Prevalence of CVD and Stroke by Diabetes Status, SC, BRFSS 2000-2001.	31
Figure 46. Number of Hospitalizations for Major Diseases & Procedures by Diabetes Status, SC, 2001.	32
Figure 47. Distribution of Complications among Inpatients with Diabetes as Primary Diagnosis, SC, 2001.	32
Figure 48. Age-Adjusted Hospitalization of Diabetic Ketoacidosis by Race-Sex, SC, 2001.	32
Figure 49. Age-specific Hospitalization Rates of Diabetic Ketoacidosis by Race-Sex, SC, 2001.	33
Figure 50. Age-Adjusted Hospitalization Rate of Diabetic Renal Failure by Race-Sex, SC, 2001.	33
Figure 51. Age-Specific Hospitalization Rate of Diabetic Renal Failure by Race-Sex, SC, 2001.	34
Figure 52. Dialysis Prevalence with Diabetes as Major Diagnosis, SC, 1997-2001.	34
Figure 53. Age-Adjusted Hospitalization Rate of Diabetic Dialysis by Race-Sex, SC, 2001.	34
Figure 54. Hospitalization Rate of Diabetic Lower Extremity Amputation by Race-Sex, SC, 1997-2001.	35
Figure 55. Age-Specific Hospitalization Rates for Diabetic Foot Amputation by Race-Sex, SC, 2001.	35
Figure 56. Number of Live Births by Mother's Diabetes Status, SC, 1990-2001.	35
Figure 57. Age-Adjusted Hospitalization Rate of Gestational Diabetes, SC, 2001.	35

Figure 58. Age-Adjusted Rate of ER Visits for Diabetes as the Primary Diagnosis by Race-Sex, SC, 1997-2001	36
Figure 59. Rates of ER Visits with Diabetes as the Primary Diagnosis by Age, SC, 1999 and 2001	36
Figure 60. Age Standardized Rate of ER Visits for Diabetes, (Primary Diagnosis), SC, 2001 ..	36
Figure 61. Number of ER Visits with Selected Diabetic Complications by Race-Sex, SC, 2001	37
Figure 62. Number of Patients with Multiple ER Visits for Diabetes as Primary Diagnosis, SC, 1996 and 1999.....	37
Figure 63. Number of Patients with One or Multiple ER Visit(s) for Diabetes as Primary diagnosis by Race-Sex, SC, 1999.....	37
Figure 64. Sources of Payment for Diabetic Patients with Multiple ER Visits, SC, 2001	38
Figure 65. Total Charges for ER Visits with Diabetes as the Primary Diagnosis by Age, SC, 1997-2001	38
Figure 66. Age-Adjusted Mortality Rate for Diabetes as the Underlying Cause of Death, SC, 1990-2001	40
Figure 67. Standardized Mortality Rates for Diabetes as the Underlying Causes of Death by Race, Sex, SC, 1990-2001	40
Figure 68. Age-Specific Mortality Rate of Diabetes as the Underlying Cause of Death, SC, 2001	41
Figure 69. Age-Adjusted Mortality of Diabetes (Underlying Cause of Death), SC, 1999-2001	41
Figure 70. Average Number of Years of Potential Life Lost for Diabetes as Underlying Cause of Death by Race-Sex, SC, 1996-2001	41

Acronyms

ACSC	Ambulatory Care-Sensitive Conditions
BF	Black Female
BM	Black Male
BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CDE	Certified Diabetes Educator
CMR	Carolina Medical Review
DHEC	Department of Health and Environmental Control
DSC	Diabetes Initiative of South Carolina
DSPS	Division of Surveillance and Program Support
ER	Emergency Room
HbA1C	Hemoglobin A1C
HPSA	Health Professional Shortage Areas
MUA	Medically Underserved Areas
MUSC	Medical University of South Carolina
ORS	Office of Research and Statistics
PHSIS	Public Health Statistics and Information Services
SCDPCP	South Carolina Diabetes Prevention and Control Program
SCPHCA	South Carolina Primary Health Care Association
VA	Veterans' Affairs
WF	White Female
WM	White Male
YPLL	Years of Potential Life Lost

Executive Summary

Diabetes mellitus is a major public health problem in South Carolina. At least 250,000-350,000 people in South Carolina have diabetes. The disease is a chronic disorder which is often accompanied by complications, including blindness, kidney failure, heart attacks, strokes, and amputations. High blood pressure and abnormal cholesterol levels are frequent. Medical costs rise with increased duration of the disease, and lifespan is shortened by 5-10 years in most patients.

The Burden of Diabetes Report 2003 opens with descriptions of changes in South Carolina's population and the present shortage of health professional coverage in the 46 counties of South Carolina, but also describes many of the exciting new trends that are occurring. According to the 2000 census, South Carolina's population has increased by over one-half million people since 1990, and is becoming more diverse. The populations of ethnic groups other than white or black have increased dramatically while the number of whites and blacks has changed very little. Improved training of health professionals at the college, graduate school, and postgraduate school levels is occurring. Increasing numbers of primary care physicians, certified diabetes educators, and pharmacists trained in diabetes have emerged, but are still short of desirable goals.

The present report indicates that many of the trends recognized in the baseline Burden Report of 1996 are continuing. The prevalence of diabetes in South Carolina has been increasing, and at 8.1%, it is among the highest in the country, higher in our non-white population (10.6%) than in the white population (7.3%). The racial disparity is narrowing in diabetes prevalence, primarily,

because the prevalence in the white population is increasing

Presently, disquieting trends are seen in some risk factors for diabetes. The major findings in serial Behavior Risk Factor Surveillance Survey (BRFSS) analyses have been an alarming increase in diabetic individuals who are overweight or obese, and who have high blood cholesterol and hypertension. More than 60% of adults in South Carolina are overweight, and the rates have increased from 45% in the past decade. More than 70% of people with Type 2 diabetes are overweight, and this is a major contributor to the insulin resistance, which characterizes the disease.

Total numbers of hospital discharges with a primary diagnosis of diabetes are increasing. Total hospital charges for diabetes also have been increasing, and in 2001 were \$928 million. Average hospital charges are also increasing, and the highest charges are seen in those over age 50. Medicare claims were filed for over half of total charges in 2001. Length of hospital stay has changed very little in recent years. Numbers of patients on renal dialysis continue to increase. Emergency room visits and costs are also on the increase, especially in non-whites. A problem area is the increasing use of the emergency room for diabetes visits over the past 4 years. In 2001, the rates among blacks were more than 5 times those of whites. Numbers of patients with Emergency Room (ER) visits increased by 46% between 1996-99, and total charges for ER visits rose 115% between 1997 and 2001.

Serious complications of diabetes, such as hospitalizations for ketoacidosis, admissions for kidney failure, and renal dialysis, have all

increased between 1997 and 2001. In all cases, significant increases have been seen particularly in non-white when compared to white individuals. The prevalence of myocardial infarction and stroke are increased 5-fold among people with diabetes in South Carolina.

Approximately 3000 South Carolinians die from diabetes every year. Data in South Carolina indicated that mortality of diabetes increases exponentially with age. The majority (82%) of deaths from diabetes occurred among people aged 60 and older. Race-sex specific mortality tracked closely with the patterns of diabetes-related risk factors and morbidity. Minorities, predominantly blacks, experienced a substantially higher death rate and greater years of potential life loss than whites.

There are encouraging trends, however. One encouraging trend is that the rates of physical inactivity are steadily decreasing in South Carolina; eventually this should be translated into a decreased prevalence of obesity. Another encouraging trend is a decrease in the prevalence of cigarette smoking among men with diabetes in the state. Encouraging trends are apparent regarding pregnancy and diabetes. These probably reflect improved blood sugar control. One encouraging trend is the 45% decrease in lower-extremity amputations in diabetics in the past five years, but particularly in the past three years. Short-term surrogate measures and actions such as hemoglobin A1c (HbA1c) tests, foot examinations, and eye examinations have been improved in recent years. Overall, there has been improvement in areas of knowledge of diabetes and access to prevention and intervention services.

Hospitalization rates for renal failure are still more than doubled among blacks when compared with whites. Finally, after a steady rise in mortality related to diabetes from

51/100,000 to 81/100,000 population between 1980 and 1995, mortality rates have shown an overall decline, and the trend is expected to continue in future years.

The complications of diabetes may be prevented or delayed by specific actions. Improved blood glucose control will slow progression of eye, kidney, and nerve complications. Control of elevated blood pressure and high cholesterol, use of specific drugs for protein loss in the urine, improved nutrition, exercise, foot care, and low dose aspirin therapy have now all been shown to markedly reduce the risks of renal failure, blindness, stroke, heart attacks, and amputations in people with diabetes.

Unfortunately, we have a long way to go! Survey data show that 50% of people with diabetes in South Carolina check blood glucose less than one time a day. However, 70% have had two HbA1c tests, the gold standard marker of long-term blood glucose control, in the past year. This is a marked improvement since 1994-97, when only five percent were checking HbA1C once a year or more. Studies have conclusively shown that as little as a 10% reduction in the level of HbA1c will reduce the risks of eye, kidney, or nerve damage 25 to 50%! Over 68% of diabetic people have had their eyes checked in the past year, and close to 90% have had their feet examined. These steps are critical if one is to avoid the serious complications of blindness and amputations.

There are active efforts to train health care providers, to educate and encourage persons with diabetes to take control of their diabetes through self-management (dietary changes, exercises, smoking cessation, seeking regular medical care, and performing visual inspections of extremities), and to promote changes in the health care system and the community to improve diabetes outcomes. SC

DHEC has had a separately funded DPCP since 1994. Also, in July 1994, the South Carolina Legislature established the DSC, with a Diabetes Center of Excellence at the Medical University of South Carolina (MUSC) and a governing Board, and active councils. The Initiative works closely with SCDPCP/DHEC via its widely representative Board of Directors and through its Surveillance and Outreach Councils, committees, and task forces. A 10 Year Strategic Plan was implemented by DSC in 1998, and results from successive Burden of Diabetes in South Carolina reports are used to monitor progress.

The SCDPCP and DSC have an impressive number of new educational and outreach programs for people affected by diabetes and its complications. Optimal management and treatment of diabetes and prevention of diabetes complications are a high priority of the continued efforts of the SCDPCP and the DSC. Increasing resources of diabetes control in South Carolina, particularly rural health settings, targeting high-risk populations are objectives of DSC and SCDPCP.

The Diabetes Initiative has an unprecedented dissemination of guidelines for care and management strategies to all primary care physicians in South Carolina Coalition development by SCDPCP and DSC in four geographic areas in South Carolina is now underway, and will serve as a direct link to communities and people affected by diabetes. The problem now is to make health professionals and people with diabetes fully aware of these guidelines and to take immediate medical action.

The DSC Strategic Plan calls for a ten-year program directed at these issues. Results of these programs will be regularly monitored by the DSC Board and by SCDPCP. Objective data on costs, complications, morbidity and mortality will be reported in periodic issues of this Burden Report. We can be optimistic that this multi-faceted statewide program will gradually make a real impact upon the consequences of diabetes and its complications in South Carolina.

Introduction

Diabetes has an immense impact on public health and medical care in South Carolina. Diabetes is the sixth leading cause of death in South Carolina, claiming more than 1,089 lives each year. People with diabetes are at increased risk for blindness, lower extremity amputation, kidney failure, nerve disease, hypertension, ischemic heart disease, and stroke. Approximately 300,000 South Carolinians are affected by diabetes, many of who were still undiagnosed in 2001. One of every seven patients in a South Carolina hospital has diabetes. The total direct and indirect costs of hospitalizations and emergency room visits were over \$928 million in 2001. The burden of diabetes is more significant in minority and elderly groups.

This report is a description of the impact of diabetes, including trends, disparities, morbidity, mortality, and costs. The wide range of information presented here is intended to:

- Assist health care professionals and family members of persons with diabetes to understand more fully the scope of the disease in our state;
- Describe progress made in recent years with patient, physician, and other health provider education, and attempts to improve access to high quality self-management training for persons with diabetes; and
- Identify continuing needs and opportunities for diabetes control in South Carolina.

METHODS

The data presented in this report were compiled from a variety of sources obtained mostly in 2001, including census data, vital records, hospital discharge data, emergency room records, the South Carolina Statistical Abstract and the Behavior Risk Factor Surveillance System (BRFSS). The former data sets are complete representations of events in South Carolina; however, the BRFSS is based upon a randomly selected, interview sample of South Carolinians over age 18 years.

There are limitations to the BRFSS data in terms of the representation of all regions of the state and all population groups. Rural and African-American persons are under-represented by the telephone interview system. The frequency of responses by a particular population group (e.g., 65 years and older African-American women) may be rather small, so in several instances multiple years of data were pooled, or regions of the state were combined to achieve reliable frequencies for this report. In that regard, the racial composition of the data is divided into two groups, based on the designation of the census [population-level] data as white and nonwhite. The nonwhite component of South Carolinians, which is about 30% of the state population, is about 96% African-American.

The data on hospitalizations and Emergency Room visits comes from the Inpatient and Emergency Room Discharge data sets collected and maintained by the Office of Research and Statistics of the South Carolina Budget and Control Board. These data sets are compiled from billing data

supplied by all civilian instate hospitals. These datasets contain information on admissions to hospitals and Emergency Rooms, including diagnoses, procedures performed, length of stay, and charges. These datasets, while extremely valuable in chronic disease surveillance, have their limitations. Because the hospital discharge data includes only hospital discharges from all instate civilian hospitals, patients seeking health care in the hospitals outside the state or in the Veterans Administration system are not included in the data.

In recent years, some changes in the structure of the datasets have made comparisons of data with previous years impossible. In 2000, a change in policy limited the number of secondary ICD9 diagnosis codes available on the dataset to four data fields, as opposed to nine data fields in previous years. This artificially deflated the number of cases based on any given secondary diagnosis code and reflected, in some cases, decreases in numbers of admissions which were not valid.

Part I: The Burden of Diabetes in South Carolina

Chapter One: Demographics and Access to Health Care

South Carolina has experienced several dramatic changes in population in the past 10 years. These changes have a huge impact on the interpretation and evaluation of health statistics. Changes over the past 10-20 years in demographics, urban and rural environments, access to health care, and health professional coverage are presented in this chapter, setting the stage for and giving context to the data presented in the next three chapters.

Chapter Two: Risk Factors

Diabetes is a slowly developing, metabolic disease. The risk of diabetes increases with age and in persons who have a family history of the disease or ones who belong to high-risk ethnic groups, for example, African Americans and Hispanics. Many behavioral factors contribute to the development of diabetes and its complications. The BRFSS collects information about a variety of modifiable behavioral risk factors for diabetes, and information about patterns of care seeking and utilization of care by persons with diabetes. These data are reviewed in the opening chapter with representations of trends over recent years, and across age, race, and gender groups among all South Carolinians.

Chapter Three: Morbidity

Diabetes imposes a major impact on health care utilization and costs in South Carolina. This chapter describes the prevalence rate of diabetes across selected age, race and gender groups in South Carolina, with information about trends over time. Next, this chapter contains extensive data for the burden of diabetes on the medical care system in terms of hospitalizations, costs and lengths of stay. In addition, this chapter highlights data on a variety of diabetes-related complications, and conditions associated with higher risk in persons with diabetes. Also, this chapter contains information about the patterns observed for persons with diabetes related to emergency room visits. Diabetes among pregnant women and its impact on the outcomes of pregnancy is presented in this chapter, as well.

Chapter Four: Mortality

Deaths from diabetes and diabetes-related conditions are described in this chapter, over time, and by population groups (race, gender). Topics such as years of potential life lost, and impact for infant mortality from maternal diabetes are also presented.

websites for diabetes data, education, care, and research.

Part II: Diabetes Initiative of South Carolina Strategic Plan Progress Report

Chapter One: Diabetes Initiative of South Carolina

The DSC objectives for controlling diabetes are directed to promoting greater attention from primary care providers for regular medical surveillance of persons with diabetes; taking appropriate actions, and improving greater recognition of patient's personal responsibility of people with diabetes. The main goal is to reduce the disparity for avoidable morbidity, mortality and risk factors that exist between whites and African-Americans with diabetes in South Carolina. The objectives for the DSC, which were set forth in the statewide plan for the control of diabetes, are listed in Part II of this report.

Chapter Two: Diabetes Data Resources

The DSC and SCDPCP have made extensive efforts to identify groups and agencies working with persons with diabetes, whether in terms of patient education or clinical care, all across the state. The statewide resources for data and research are presented in this section, as well as information about how to contact these groups, and a list of state and national

Part I: Burden of Diabetes in South Carolina

Chapter One Demographics and Access to Health Care

Demographics

South Carolina has experienced several dramatic changes in population in the past 10 years. These changes have a huge impact on the interpretation and evaluation of health statistics. As of the 2000 census, South Carolina's population was reported to be just over four million people. This is an increase of over a half million people since 1990.

Table 1. Population Distribution as of 2000 Census

Total Population	4,012,012	100.0%
Men	1,948,929	48.6%
Women	2,063,083	51.4%
Under 18 years	1,011,027	25.2%
18 to 44	1,592,420	39.7%
45 to 64 years	923,232	23.0%
65 years and over	485,333	12.1%
White, not Hispanic	2,652,291	66.1%
Black, not Hispanic	1,178,486	29.4%
Hispanic or Latino	95,076	2.4%
American Indian and Alaska Native	12,765	0.3%
Asian	35,568	0.9%
Other*	37,826	0.9%

Source: U.S. Census Bureau, Census 2000.

*Other Includes Native Hawaiian or Pacific Islander, Two or More Races, or Some Other Race

The population for South Carolina is about 67% white, 30% black, and 3% "other". The "Other" category includes Asian,

American Indian, Pacific Islander, and other race groups, as reported by the Census Bureau. Table 1 shows the 2000 population for South Carolina. Figures 1 through 3 show the breakdown of the population by race/ethnicity and age.

Figure 1a. South Carolina Population 1990 Racial / Ethnic Distribution

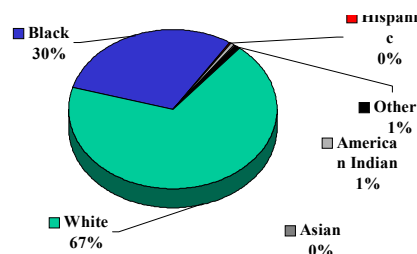
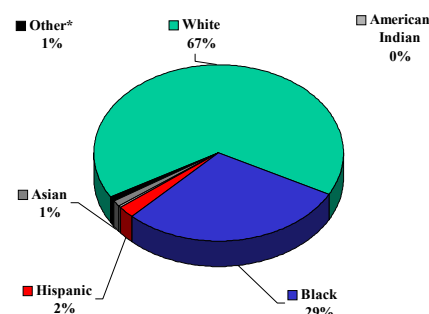


Figure 1b. South Carolina Population 2000 Racial / Ethnic

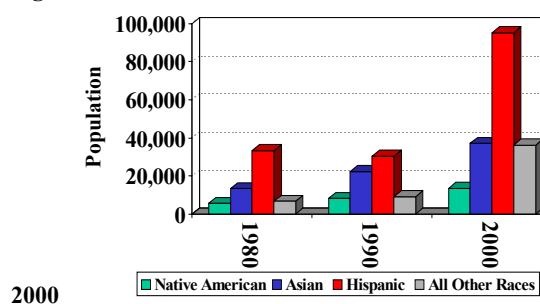


Distribution

The population of South Carolina is becoming much more diverse. Since 1980, the numbers of Hispanic citizens of all races has doubled, American Indians, Asians, Pacific Islanders, and other races other than white or Black have shown a three-to-seven-

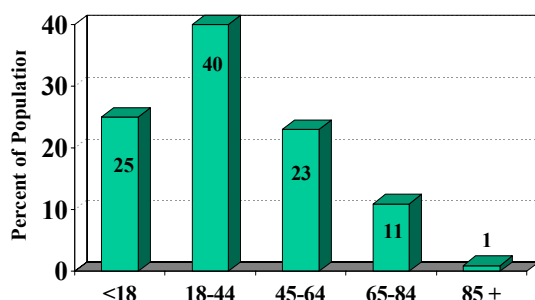
fold increase, while the number of white and Blacks has changed very little. Figure 2 shows the change in the ethnic makeup of the South Carolina population in the past 20 years.

Figure 2. Trends in Race/Ethnic Populations 1980-



The majority of South Carolina's population falls into the 18-44-age category, but almost one quarter (23%) falls into the 45-64 age group, where most diabetes is diagnosed (Figure 3).

Figure 3. Age Distribution

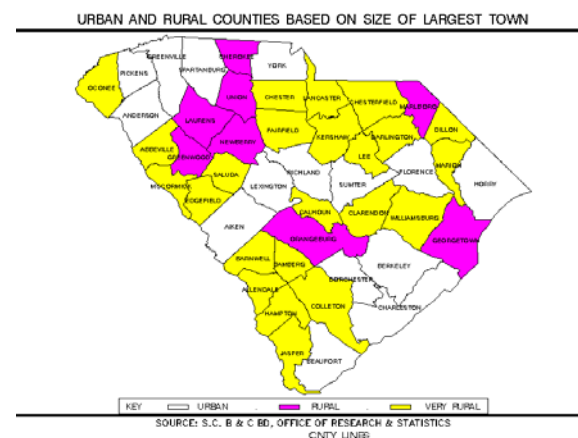


Urban VS Rural

The Office of Research and Statistics (ORS) of the South Carolina has researched a variety of health indicators by urban vs. rural counties. The location of these counties is found in figure 4. Urban counties have been defined as those with the largest town having a population of 25,000 or greater. The counties defined as urban by the ORS are Aiken, Anderson, Beaufort,

Berkeley, Charleston, Dorchester, Florence, Greenville, Horry, Lexington, Pickens, Richland, Spartanburg, Sumter, and York. Lexington and Pickens counties are considered urban since they are bedroom communities to major metropolitan areas.

Figure 4. Urban, Rural and Very Rural Counties in South Carolina



Rural counties, which comprise 29% of South Carolina's population, are those whose largest town has a population less than 25,000 but greater than 10,000. Rural counties are Cherokee, Georgetown, Greenwood, Laurens, Marlboro, Orangeburg, and Union.

Very Rural counties are those with largest town less than 10,000 population. Very rural counties are designated as Abbeville, Allendale, Bamberg, Barnwell, Calhoun, Chester, Chesterfield, Clarendon, Colleton, Darlington, Dillon, Edgefield, Fairfield, Hampton, Jasper, Kershaw, Lancaster, Lee, Marion, McCormick, Oconee, Saluda, and Williamsburg.

For the rural counties in South Carolina, the ORS reported that:

- 29% of South Carolina's population is rural.
- 40% of South Carolina's rural population is black.

For the very rural counties in South Carolina, the ORS reported that:

- 18% of South Carolina's population is very rural.
- 42% of South Carolina's very rural population is black.

For urban counties the ORS reported that:

- 71% of South Carolina's population is urban.
- 74% of South Carolina's urban population is white.
- 26% of South Carolina's urban population is black.

The ORS conducted research on preventable hospitalizations in urban vs. rural counties. Preventable hospitalizations, which are also known as Ambulatory Care Sensitive Conditions (ACSC), refer to hospitalizations for conditions that should be treatable on an outpatient basis. Thus, these hospitalizations may indicate an inability of certain individuals to access necessary preventive and outpatient care. Ensuring equitable access to health care is an important public policy goal for the state of South Carolina. Preventable hospitalizations are one measure of access to health care.

Analyses reveal that rural residents are more likely to be hospitalized for conditions that should have been treatable on an outpatient basis. Here are some of the consequences of lack of access to health care in the rural areas of the state:

- Overall, rural residents are 26% more likely to be hospitalized for a possibly preventable hospitalization than urban residents.
- Rural adults aged 19-44 are 23% more likely to be hospitalized for diabetes than urban adults.

- Rural blacks are 57% more likely to die from diabetes than are rural whites.
- Very rural blacks are 70% more likely to die from diabetes than are very rural whites.
- 48% of rural residents (and 55% of very rural residents) who are hospitalized are hospitalized out of county (versus 19% in urban areas).

The Uninsured in South Carolina

The rural areas are commonly known to have higher rates of uninsured citizens as well as higher proportions of citizens who receive Medicaid or Medicare. Lack of insurance decreases significantly the likelihood of receiving timely and appropriate care. High proportions of Medicaid and Medicare clients affect the reimbursement levels of hospitals and physician practices as well as having implications on individual's likelihood of receiving specialty care.

- Everyday in rural South Carolina, 112 people receive medical services for which they cannot pay. Over half (54%) of these uninsured rural residents are non-white.
- Almost one out of five people from rural areas who visit the ER have no source of insurance.
- Medicare and Medicaid paid for 55% of rural inpatient hospitalizations in 1999.
- Medicaid pays for a greater proportion of hospitalizations and ER visits in rural than urban areas.

The South Carolina Department of Insurance has published on their website (<http://www.doi.state.sc.us/Eng/Public/Health/>) a report pertaining to the increasing number of people without health insurance in South Carolina:

During the past decade, the number of people without health insurance in the United States increased from approximately 31 million to 44.3 million people. National statistics indicate that 15.4% of South Carolinians were uninsured in 1998. One year later, the number of South Carolinians that were uninsured grew to 17.6% or 683,890 people. Interestingly, eight in ten of the uninsured are members of working families . . .

Studies indicate that the majority of the uninsured are non-elderly full-time workers. According to estimates from the Kaiser Foundation, 26% of non-elderly African Americans are uninsured in South Carolina. Typically, they earn low wages and work in service industries, agricultural enterprises, and small businesses that do not offer health insurance to their employees. Those small businesses that are able to offer insurance coverage often require premium cost sharing . . . In addition, rising health care costs have made it difficult for small employers to offer coverage. Rising health care costs are a result of many factors, however it is a fact that access to necessary preventative and outpatient care will lower the number of preventable hospitalizations. Rural adults in South Carolina, aged 19-44, are 34% more likely to be hospitalized for a possibly preventable hospitalization than urban adults. Medicare and Medicaid paid for 35% of rural inpatient hospitalizations in 1999 in South Carolina.

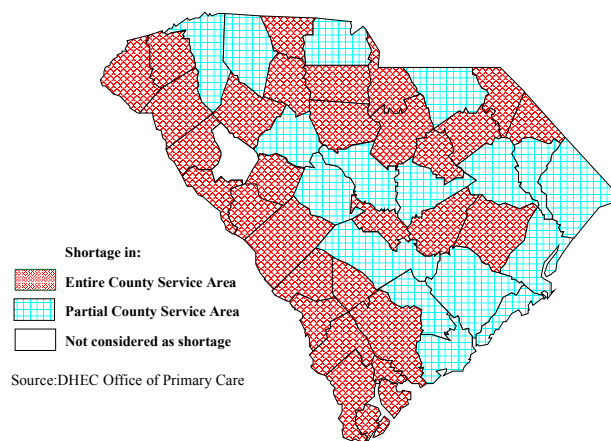
Consequently, people with low incomes and no insurance coverage often are unable to seek or obtain timely or adequate health care, turning to emergency room or other safety net providers, such as community health centers and public hospitals, or forego care entirely. Compared to those who are insured, the uninsured tend to have more serious preventable illnesses that

threaten their work productivity and ability to retain jobs.

Health Professional Shortages

One of the first priorities is to have sufficient numbers of health professionals that are distributed according to need, to provide ongoing, quality diabetes care and self-management education and support for persons with diabetes. Most counties in South Carolina have a shortage of health professionals as defined by the Office of Primary Care of the Department of Health and Environmental Control (DHEC). Figure 5 depicts the distribution of medical professional shortage area in South Carolina in 2002. Twenty-nine counties were defined medical professional shortage areas, and 16 counties had areas within the county that were defined as medical professional shortage areas.

Figure 5. South Carolina Health Professional Shortage Areas, by County 2002



In 2003, 44 of the 46 counties of South Carolina were designated **MEDICALLY UNDERSERVED AREAS** by the U.S. Public Health Service for either the total county or certain areas of the county. Only two counties, Cherokee and Laurens, are deemed to be adequately served. This designation takes into account physician-to-

population ratio, infant mortality rate, and poverty level, and percent of population age 65 years and older. In health professional shortage areas, there are 18 federally funded community health centers distributed throughout the state. These health centers provide services based on a “sliding fee scale” that can assist those with limited incomes who may need assistance with financing health care, self-management education, medications, and monitoring supplies. (A listing of South Carolina’s Community Health Centers may be obtained via the Internet at http://web.infoave.net/~scphca/community_health_centers.htm).

Physicians

Physicians play important roles in health care for diabetes. A report was made to the Commission on Higher Education and the South Carolina Data Oversight Council by the Health Professions Functional Work Group, Primary Care Subcommittee, and South Carolina Budget and Control Office of Research and Statistics in 1995. This report predicted a 20% shortage of primary care physicians in South Carolina by the year 2005. The projected demand for total primary care physicians on a statewide basis for 2005 is 2,971 while the projected supply is 2,382. Of the primary care physicians, Family Practice is expected to see a mere 3.6% increase between 1994 and 2005. Pediatrics, Internal Medicine, and Obstetrics/Gynecology physicians are expected to increase by 36.4%, 29.2%, and 21.2% respectively between 1994 and 2005.

Table 2. Physician Specialties most involved in Diabetes Care in South Carolina

Specialty	1995	2002	Patients Per Physician (2002)
Internal Medicine	394	394	760
Cardiology	119	331	905
Endocrinology	11	47	6,372
Nephrology	43	76	3,941
Neurology	54	157	1,908
Ophthalmology	177	310	966
Family/General Practice	747	1509	198

Table 2 lists the number of Physicians (based on data from DSC Diabetes Center Council Strategic Plan) in those specialties most involved with diabetes care. The table also lists ratios of patients to physician (i.e. number of people with diabetes served, on average, by one physician of that specialty). Using the figure of 299,500 persons with diabetes in South Carolina gives one a sense of the relative scarcity of physician care available to patients with diabetes.

In addition to the number of physicians available being far less than the number needed, the geographic distribution of physicians imposes another problem for people with diabetes. Most of South Carolina’s physicians are located in three major city areas; very few of them practice in the counties that have higher prevalence rates for diabetes. As shown in Figure 6, physician-to-population ratio is as low as two per 1,000 population in 12 of 15 counties that have a high prevalence of diabetes (previously greater than state average).

Figure 6. Physicians Employed in South Carolina, 2002

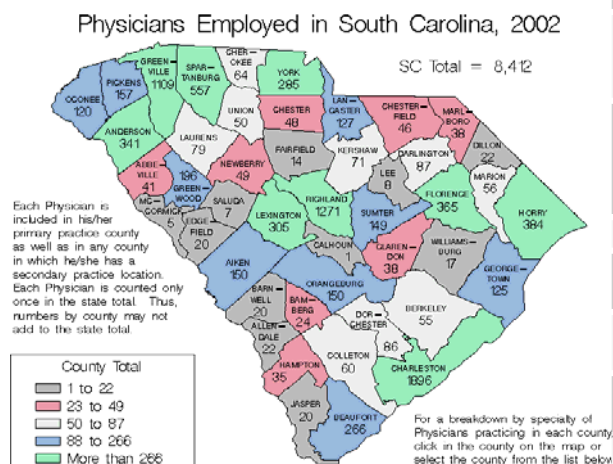


Table 3. Number of Other Health Professionals, SC

Specialty	Number in 2002	Number in 1999	Number in 1994*
Certified Diabetes Educators	251	139	85
Pharmacists with advanced diabetes education	NA	94	N/A
Podiatrists		76	02
Physician Assistants	287	206	N/A
Advance Practice Nurses	1571	2,220	N/A
Registered Dietitians	750	746	751
Registered Nurses (RNs)	30,722	37,402	23,435
Licensed Practical Nurses	9,415	11,240	8,572

* Abstracted from 1996 Burden of Diabetes Report

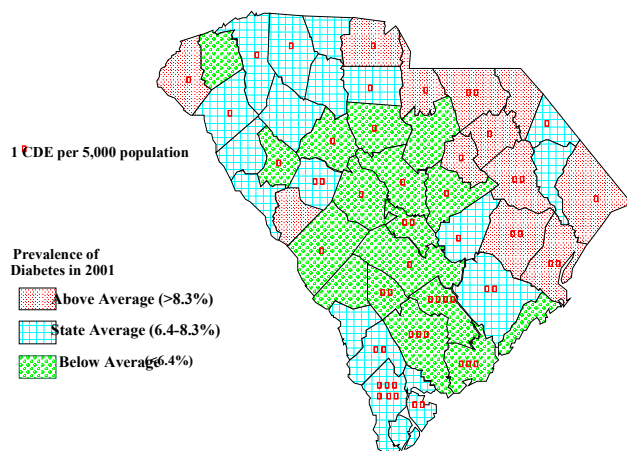
Other Health Professionals

In addition to physicians, many other health professionals, including podiatrists, Certified Diabetes Educators (CDEs), dietitians, pharmacists and nurses play a vital role in diabetes care and education. Table 3 shows that the number of nurses and CDEs has increased since 1994. The Diabetes Initiative and its partners have offered training courses to help prepare eligible health professionals to become CDEs. As the choices of medications for management expands, the pharmacist's role is increasingly vital in the control and management of diabetes. Great efforts have been made to provide diabetes disease management training programs for pharmacists in recent years. At least 94 pharmacists have completed an advanced diabetes disease management program. Some of these pharmacists have developed diabetes self-management education programs for their clients, and are working with other health providers to improve diabetes outcomes.

Certified Diabetes Educators

There were 251 Certified Diabetes Educators (CDE) in South Carolina as of 2002. On average, one CDE needs to serve 15,500 residents in South Carolina. Figure 7 shows that the number of CDEs is less than 1/10,000 of county population in approximately 30 counties. Among 12 counties that have a prevalence of diabetes greater than the state average, two counties (Edgefield and Marlboro) do not have even one CDE, and the ratio of number of CDEs to county population is less than 1/10,000 in 6 counties.

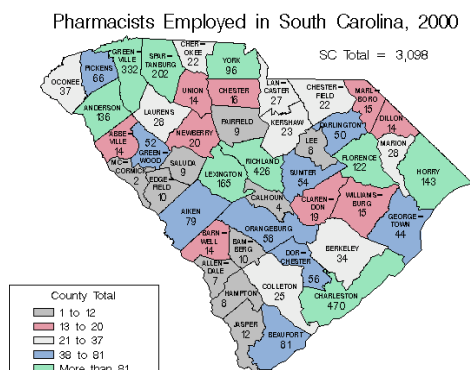
Figure 7. Average Number of CDEs in South Carolina 2002



Pharmacists

Figure 8 shows number of pharmacists employed in each county in 1999. Approximately one fourth of the counties in South Carolina do not have any pharmacists with advanced diabetes education. In the 15 counties with the highest prevalence of diabetes, three do not have any pharmacists with advanced diabetes education.

Figure 8. Pharmacists Employed in South Carolina, 2000



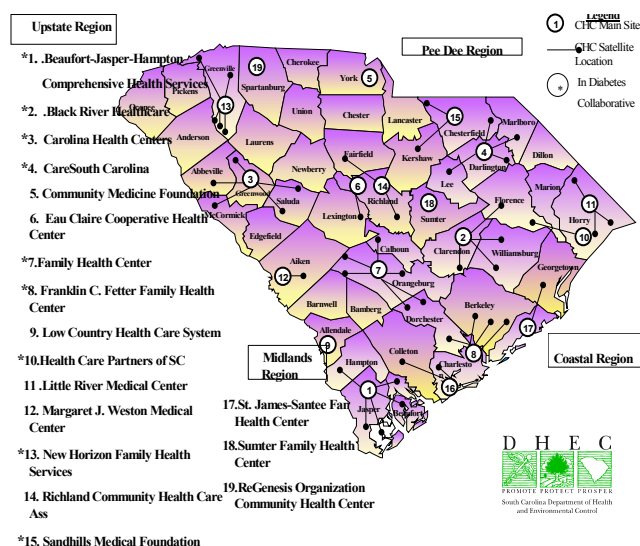
Diabetes Programs

Primary Health Care Centers

Medically underserved areas throughout South Carolina are provided high-quality medical care from 19 Community Health Centers that see more than 162,000 people annually, mostly blacks. Patients who often have no other access to primary health care are treated by physician-led health care teams that handle everything from management of chronic illnesses and immunizations to episodic sick care. Expensive and frequent visits to the emergency room are lessened or entirely eliminated by providing the communities with access to primary care.

South Carolina Primary Care Association, the lead Primary Care Association for the Southeast, currently has nine community health centers that are participating in the Diabetes Collaborative. SC DPCP staff resources are focused within eight of the centers across the state to demonstrate effective interventions. The goal of these interventions is to improve diabetes health care in office-based practices in medically underserved areas of the state and increase diabetes self-management in patients who attend these primary care centers (Figure 9).

Figure 9. Diabetes Programs in South Carolina, 2001



Local Diabetes Coalitions

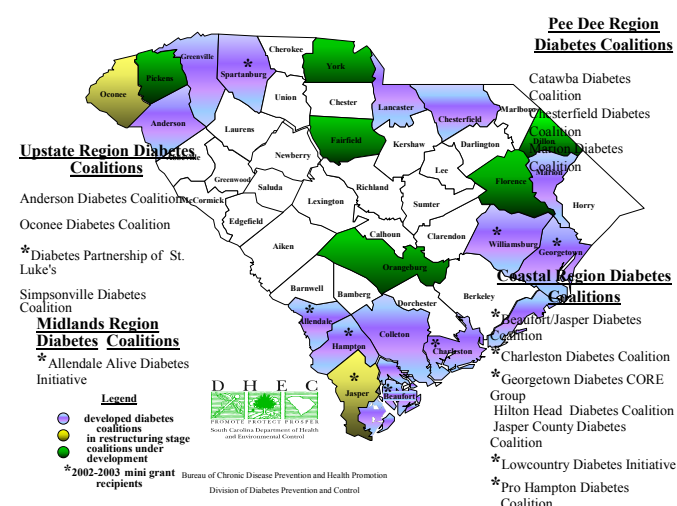
In an effort to increase awareness of the prevention and management of diabetes, local community coalition formation began in the fall of 1999. To ensure that there was a statewide linkage among the coalitions, Principles of Organization were also developed.

Currently there are twenty community coalition chapters within the four Regions across the state. The goals of the coalitions are to provide a forum for locally driven and controlled diabetes-related activities; share resources and information; increase communication and coordination; and obtain collaboration between organizations.

During both the 2002-2003 and 2003-2004 grant cycle, the SCDPCP has offered mini-grants to several of the local community coalitions to help them with infrastructure building and sustainability. During 2002-2003, seven of the community coalitions were funded and awards ranged from \$1800 to \$2000. During the 2003-2004-grant cycle, eight community coalitions were funded ranging from \$3000-\$7000. Six of

the coalitions received capacity building funding to complete the strategic planning process and two received basic implementation funding. Some planned activities will include completing Diabetes Today Training, conducting needs and resources assessments in order to develop a strategic plan for the coalition, and hosting National Diabetes Education Program (NDEP) and American Diabetes Association (ADA) campaigns (Figure 10).

Figure 10. South Carolina DPCP Diabetes Coalitions



Summary

According to the 2000 census, South Carolina's population has increased by over five hundred thousand since 1990, and is becoming more diverse. The populations of races other than white or black have increased dramatically while the number of white and blacks has changed very little. The number of trained health care professionals has increased, but is still short of desirable goals.

The combination of a growing and increasingly diverse population, increasing uninsured, shortages of medical professionals, especially in rural areas, has

serious implications with regard to access to health care in the near future. These issues impact the patients, the public health system, health care providers, the insurance industry, and the economy, as people in poor health are much less productive than healthy people.

Chapter Two Risk Factors

About 5% to 10% of all people with diabetes have Type 1 diabetes. Type 2 diabetes represents the majority of cases of this disorder, accounting for about 90-95% of all people with diabetes. A family history of diabetes is more common in Type 2 than in Type 1. Major behavioral risk factors, such as overweight, physical inactivity and unhealthy diet, are partially responsible for development of Type 2 diabetes. Inadequate access to health care and sub-optimal diabetes management contribute to uncontrolled diabetes and diabetes complications.

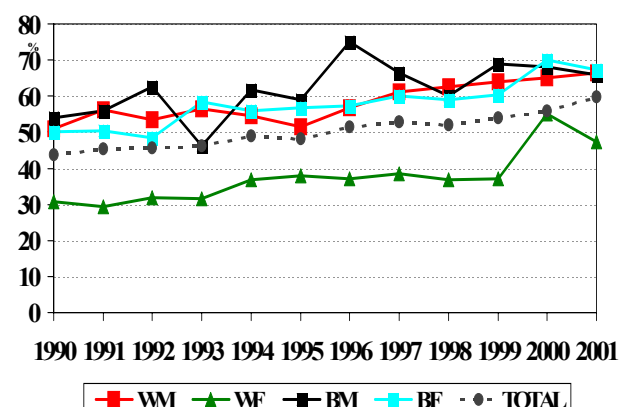
Risk Factors in the General Population

Overweight

Overweight (BMI ≥ 25 kg/m²) and obesity (BMI ≥ 30 kg/m²) are major risk factors of diabetes. More than 70% of people with Type 2 are overweight. Figure 11 presents the data from the BRFSS survey in 1990-2001. In South Carolina, nearly three out of five adult South Carolinians are overweight. In 2001, the prevalence was higher among blacks than whites, and higher among men than women.

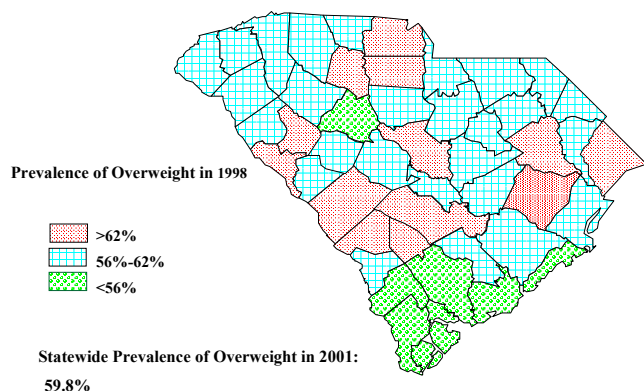
The prevalence of overweight in South Carolina adults increased by 54% from 39% in 1986 to 60% in 2001. The increases in prevalence of overweight varied among race-sex groups, from 33% among white men to an alarming 102% among white women during 1986-2001 (Figure 11).

Figure 11. Prevalence of Overweight among Adults by Race-Sex, SC, 1990-2001



According to the BRFSS survey, the statewide prevalence of overweight was 60% in 2001. Thirteen counties had a prevalence rate higher than the state average (>62%), and six counties, including five counties in the Low County and Trident Districts, had a prevalence rate lower than the state average (<56%). (Figure 12)

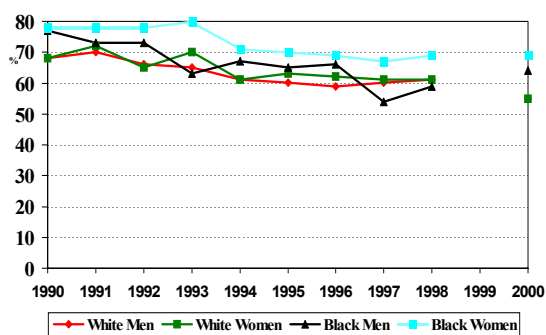
Figure 12. Prevalence of Overweight among Adults, SC, 2001



Physical Inactivity

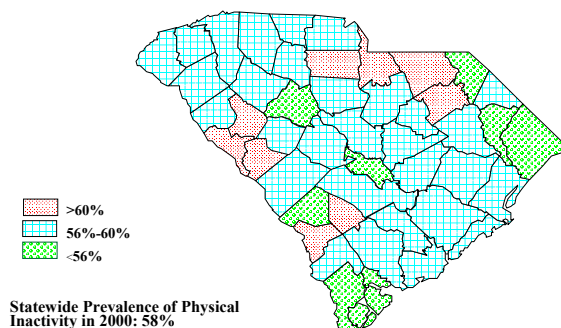
Regular physical activity reduces the risk of being overweight and promotes the body's expenditure of energy. Physical activity also reduces the risk of cardiovascular diseases, which are associated with diabetes. More than half South Carolina adults were physically inactive in 2000. Fifty-five percent of whites and 65% of blacks were physically inactive. Black women had the highest prevalence of physical inactivity (69%) among four race-sex groups. Figure 13 shows that during 1990-2000, the prevalence of physical inactivity decreased among all groups.

Figure 13. Prevalence of Physical Inactivity among Adults by Race-Sex, SC, 1990-2000



A majority of the counties in South Carolina had a prevalence of physical inactivity between 56% and 60%, which was similar to the state average (58%) in 2000. The prevalence of physical inactive was greater than 60% in nine counties. Eight counties had a prevalence rate lower than 56%. (Figure 14).

Figure 14. Prevalence of Physical Inactivity among Adult South Carolinians, 2000



Unhealthy Diet

The American Dietetic Association, the American Health Association, and the National Cancer Institute all recommend the consumption of at least five servings of fruits and vegetables a day (5-A-Day). Consuming fewer fruits and vegetables than recommended indicates an unhealthy diet that may lead to overweight. In 2000, three out of four adult South Carolinians consumed less than 5-A-Day. Men had a higher prevalence than women, and black men had the highest prevalence (81%) of consuming less than 5-A-Day among four race-sex groups in 2000. During 1990-2000, the prevalence rates fluctuated between 70% and 84%; however, the overall trend remained almost unchanged (Figure 15).

Figure 15. Prevalence of Consuming Fruits and Vegetables Fewer Than 5-A-Day among Adults by Race-Sex, SC, 1990-2000.

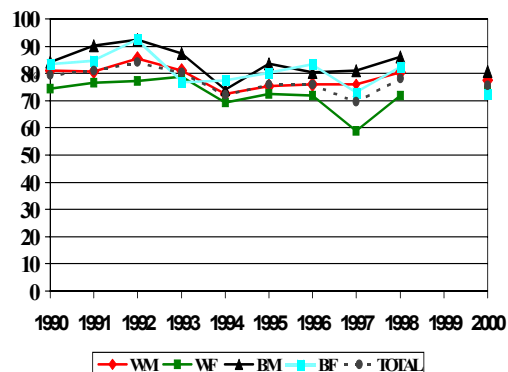
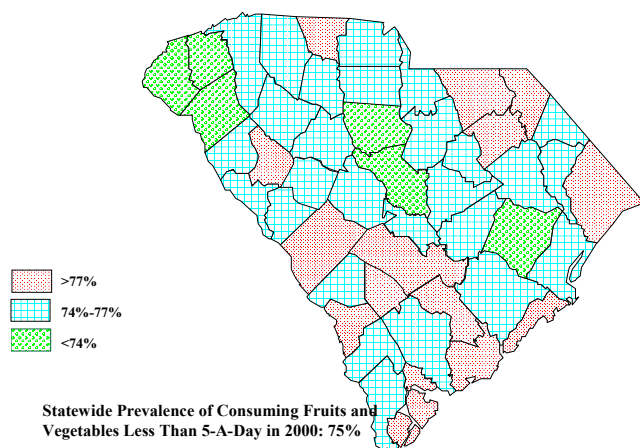


Figure 16 shows the prevalence of consuming less than 5-A-Day by county in South Carolina. No special pattern of prevalence of consuming fruits and vegetables less than 5-A-Day appears to occur by geographic distribution. Thirteen counties had a higher prevalence of consuming fruits and vegetables less than 5-A-Day than the state average (77%), while only six counties had a lower prevalence than the state average.

Figure 16. Prevalence of Consuming Fruits and Vegetables Less than 5-A-Day among Adults South Carolinians, 2000

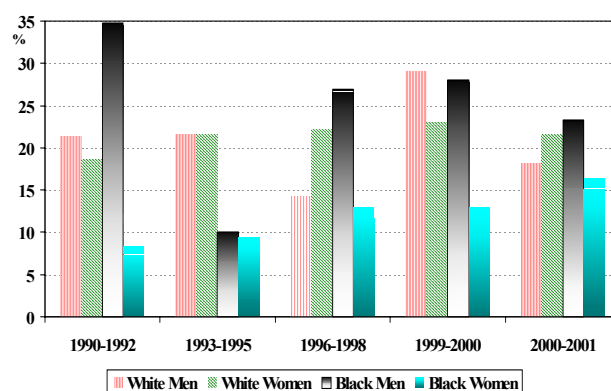


Cigarette Smoking

Although cigarette smoking is not a risk factor for diabetes, it increases the risk of diabetes related complications, especially for cardiovascular disease amputations, kidney disease and respiratory disease among people with diabetes. Overall, people with diabetes had a lower prevalence (16%-23%) of cigarette smoking than general population (26%) in 2000-2001.

Among people with diabetes, black men had the highest prevalence (23%) of cigarette smoking, while black women had the lowest prevalence (16%) among four race-sex groups (Figure 17). The prevalence of cigarette smoking among people with diabetes increased by 18% among white men, 34% among white women and 30% among black women during 1987-2001. An encouraging trend is that the prevalence decreased by 33% among black men in the same time period.

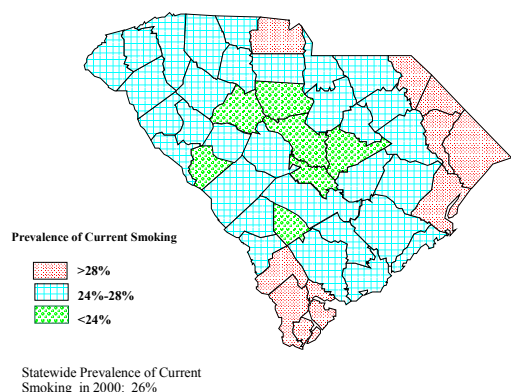
Figure 17. Prevalence of Current Cigarette Smoking among Adults with Diabetes by Race-Sex, SC, 1990-2001



The overall prevalence of cigarette smoking in South Carolina was 26% in 2001. Figure 18 presents counties in three categories: counties with prevalence higher than state

average, counties with prevalence similar to the state average, and counties with prevalence lower than the state average. There were nine counties with the prevalence of cigarette smoking greater than 28%. The counties with a high prevalence mainly are located in the eastern counties (Pee Dee and Waccamaw) and the southern (Low County). Counties that have the prevalence lower than 24% were mainly those that are located in the center of the state (Midland and Wateree) in 2000.

Figure 18. Prevalence of Current Cigarette Smoking among Adults, SC, 2001

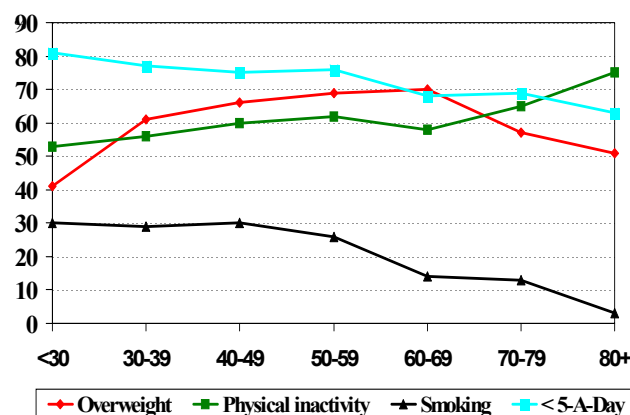


Age-Specific Prevalence of Major Behavioral Risk Factors among Adults

Figure 19 presents age-specific prevalence of four risk behavioral risk factors: overweight, physical inactivity, consuming fruits and vegetables less than 5-A-Day, and cigarette smoking. Young adults (under 30 years of age) have the highest prevalence of smoking, and the highest prevalence of consuming fruits and vegetables less than 5-A-Day, but the lowest prevalence of overweight, and the lowest prevalence of physical inactivity among all age groups. Middle age adults (age between age 30 and

70) have an increasing prevalence of overweight and physical inactivity by age, but a decreasing prevalence of consuming fruits and vegetables less than 5-A-Day and cigarette smoking by age. Old adults (age 70 years and older) have the lowest prevalence of smoking and the lowest prevalence of consuming fruits and vegetables less than 5-a-Day, but have the highest prevalence of physical inactivity among all age groups.

Figure 19. Age-Specific Prevalence of Major Behavioral Risk Factors among Adults, SC, 2000



Hypertension and High Cholesterol

Control of hypertension and high cholesterol are important ways to prevent diabetes related complications. People with diabetes are more likely to have hypertension and high cholesterol than people without diabetes. In 2000-2001, nearly two-thirds of people with diabetes had hypertension, while only one-fourth for people without diabetes had hypertension. Almost four out of five (83%) black women with diabetes had hypertension, a prevalence that was the highest among race-gender groups. Compared with the data of the BRFSS in 1994-1997, the prevalence of hypertension

among people with diabetes increased among white men, white women and black women, but decreased among black men. (Table 4)

Table 4. Prevalence of Hypertension in South Carolina, 1994-1997 and 2000-2001

	1994-1997		2000-2001	
	People with Diabetes	People without Diabetes	People with Diabetes	People without Diabetes
White Men	40.7	19.4	66.1	23.4
White Women	57.1	22.7	63.6	23.5
Nonwhite Men	69.5	26.0	59.0	26.5
Nonwhite Women	74.8	30.3	82.8	30.0

Nearly half of people with diabetes have high cholesterol. Table 5 shows that the prevalence of having high cholesterol among people with diabetes was 63%-140% higher than that among people without diabetes. White men with diabetes had the highest prevalence (55%) of having high cholesterol among all race-sex groups in 2000-2001. Compared to the data in 1994-1997, the prevalence of having high cholesterol in 2000-2001 increased among white men with diabetes.

Table 5. Prevalence of High Cholesterol in South Carolina 1994-1997 and 2000-2001

	1994-1997		2000-2001	
	People with Diabetes	People without Diabetes	People with Diabetes	People without Diabetes
White Men	34.7	24.3	55.2	23.4
White Women	45.3	27.4	44.5	25.6
Nonwhite Men	36.5	19.3	31.5	19.3
Nonwhite Women	45.3	25.3	45.3	18.8

Control of Diabetes with Insulin or Diabetes Pills

BRFSS surveyed the means of control of diabetes, using either insulin or diabetes pills, among people with diabetes. Diabetes pills are used more often than insulin among people with diabetes. Approximately two-thirds of people with diabetes take diabetes pills. The prevalence of using insulin to control glucose level among blacks was almost twice that among whites (Figure 20).

Figure 20. Prevalence of Taking Insulin or Diabetes Pills Among People with Diabetes, SC, 2000-2001.

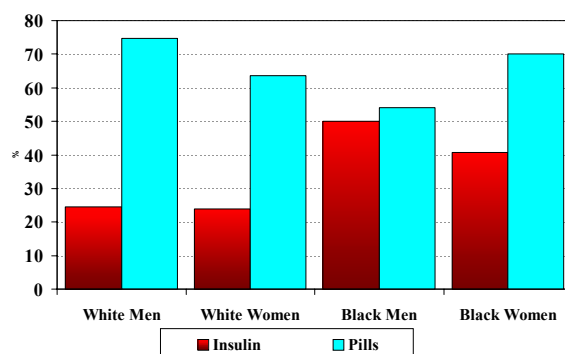
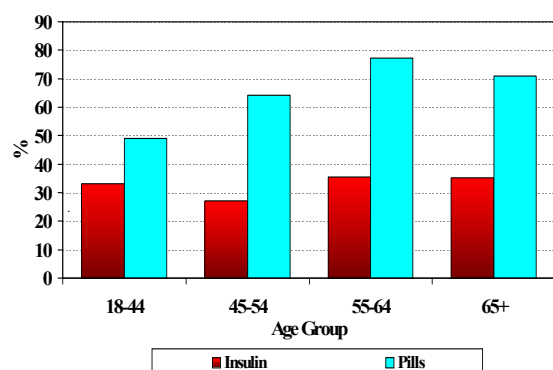


Figure 21 illustrates the prevalence of using of insulin or diabetes pill by age groups. Insulin was almost equally used among all age groups. However, the prevalence of using diabetes pills increased with patient's age, and reached a peak of 77% among people age between 55 and 64.

Figure 21. Prevalence of Taking Insulin and Diabetes Pills by Age among People with Diabetes, SC, 2000-2001.



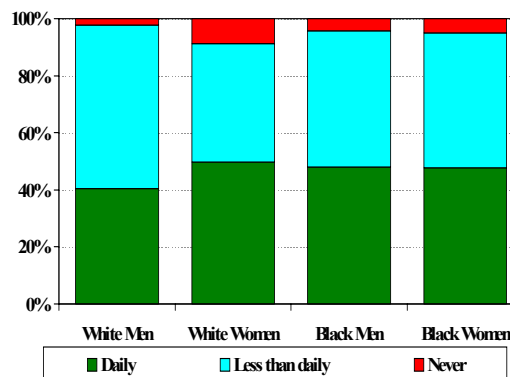
Regularly Checking Blood Glucose

Regularly monitoring blood glucose level is the foundation of appropriate management of diabetes. Figure 22 shows that although approximately 95% of people with diabetes checked their blood glucose level, less than half did so daily. This is still a marked improvement over 1994-97 when only 5% of diabetics checked their blood glucose one to four times daily. White men had the lowest prevalence (40%) of checking glucose on daily basis among race-sex groups.

Many people with diabetes who had their glucose checked, monitored their glucose level less than once a day. The prevalence of having glucose checked less than once a day ranged from the highest rate of 57% among white men to the lowest rate of 42%

among white women. It is worthwhile to notice that many women, especially white women (8%) reported they never had their glucose checked. While there is room for further improvement in these measures, frequency of blood glucose monitoring has improved significantly since 1994-97 (previous Burden Report).

Figure 22. Prevalence of Having Blood Glucose Checked among People with Diabetes by Race, Sex, SC, 2000-2001.



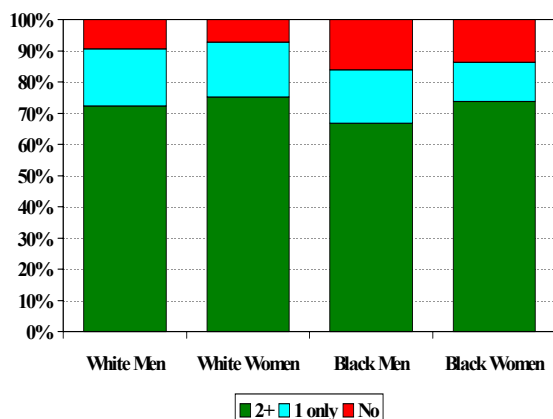
Checking HbA1C

Hemoglobin A1c (HbA1c) or glycosylated hemoglobin is a recommended measure of average blood glucose level in the past 2-3 months. The American Diabetes Association recommends that people with diabetes should have their HbA1c checked every three months for monitoring long-term glucose control. In 2000-2001, more than 70% of people with diabetes had at least two HbA1c tests in the past year (Figure 23). This is a marked improvement since 1994-97, when only 25% had ever heard of A1C.

Black men had the lowest prevalence (67%) of having at least two HbA1c among race-gender groups. Another 12%-19% of people with diabetes reported having only one HbA1c test in the past year. Nearly 10% of people with diabetes, including 16% of black men, 14% of black women, 9% of

white men and 7% of white women, reported having no HbA1c test in the past year.

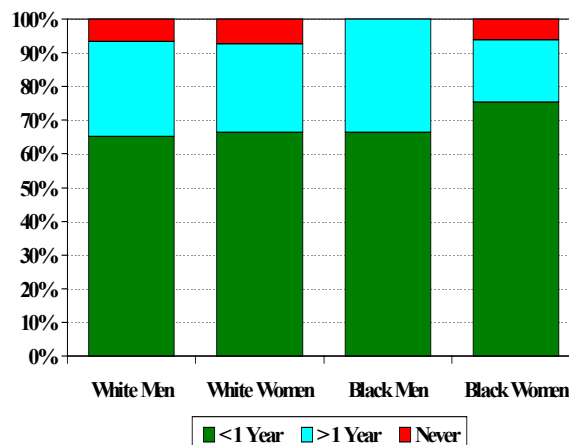
Figure 23. Prevalence of Having HbA1c Checked by Number Tests among People with Diabetes, SC, 2000-2001



Eye Examination

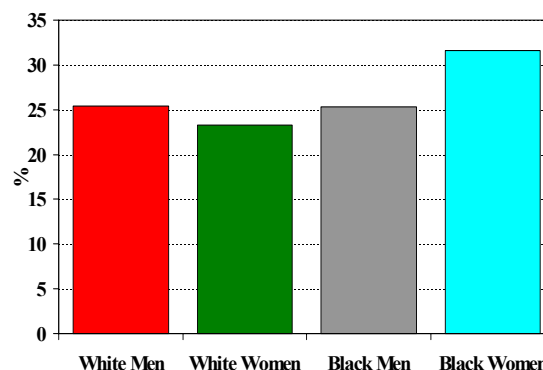
The diabetes standard of care guideline issued by the American Diabetes Association recommends an annual dilated eye exam by an eye care specialist to detect early signs of retinopathy and start appropriate treatment. Figure 24 shows that more than two-thirds (68%) of people with diabetes reported having their eyes examined in the past year. The prevalence of having eyes examined in the past year was the highest among black women (76%) among four race-sex groups. Twenty-seven percent of people with diabetes reported having their eyes examined a year ago. Approximately 5% of people with diabetes reported never having their eyes examined. Among those, women had a higher prevalence than men, and white women had the highest prevalence (7%) in all race-sex groups.

Figure 24. Prevalence of Having Eyes Examined among People with Diabetes by Race-Sex, SC, 2000-2001.



According to the BRFSS survey in 2000-2001, approximately one quarter of people with diabetes reported that their eyes were affected by diabetes. Among people with diabetes, black women had the highest prevalence (32%) of eyes being affected by diabetes, while white women had the lowest prevalence (23%) among race-sex groups. These data on eye examinations are comparable to the last Burden Report results (Figure 25).

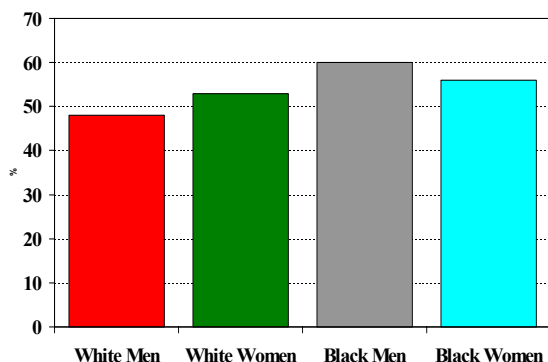
Figure 25. Prevalence of Eyes Being Affected by Diabetes among People with Diabetes, SC, 2000-2001.



Diabetes Patient Education

Diabetes patient education for self-management of diabetes is an integral component of diabetes care and management. The goal of diabetes self-management education is to enable people with diabetes to become active participants in their diabetes care and treatment. Among people with diabetes, approximately half had taken a course for managing diabetes in 2000-2001. The prevalence of having taken a course was higher among blacks, especially black men (60%), than among whites (Figure 26).

Figure 26. Prevalence of Having Taken a Course for Managing Diabetes among People with Diabetes, SC, 2000-2001.

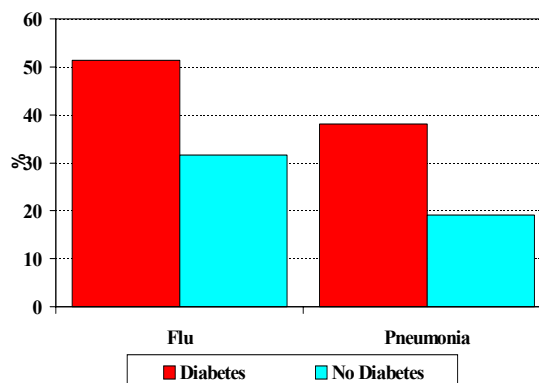


Flu and Pneumonia Vaccinations

Flu vaccination and pneumonia vaccination are recommended for people with diabetes to prevent respiratory infections. According to the 2000-2001 BRFSS survey, the prevalence of receiving flu vaccination and pneumonia vaccination were significantly higher among people with diabetes than among people without diabetes. However, there was still a great deal of people with diabetes who did not receive flu vaccination

(49%) or pneumonia vaccination (63%) in 2000-2001 (Figure 27).

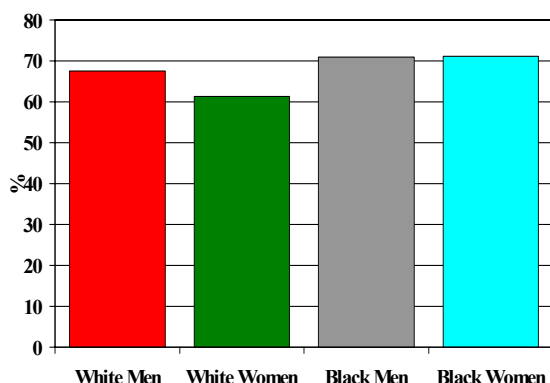
Figure 27. Prevalence of Receiving Flu Shot in Past 12 Months and Ever Received Pneumonia Vaccine among People with Diabetes, SC, 2000-2001.



Foot Examination by a Health Professional

Standard diabetes care recommended by the American Diabetes Association also includes foot examination at each medical visit. Figure 28 shows that approximately two-thirds of people with diabetes had their feet checked by a health professional. The prevalence of having their feet checked was 71% for both black men and black women, which was higher than that among white women (61%) and white men (68%) (Figure 28).

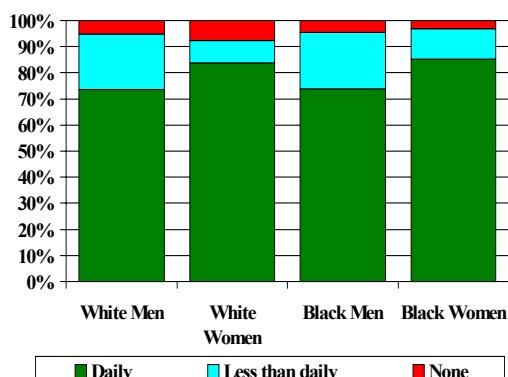
Figure 28. Prevalence of Having Feet Checked by a Health Professional in the Last Year among People with Diabetes, SC, 2000-2001.



Self-Checking Feet for Sores or Irritations

Approximately 94% of people with diabetes reported self-checking feet for sores and irritations in 2000-2001. More than three quarters of people with diabetes checked their feet daily for sores and irritations. More women (84%) checked their feet daily than did men (74%). However, approximately 6% of people with diabetes had never checked their feet for sores and irritations by themselves (Figure 29).

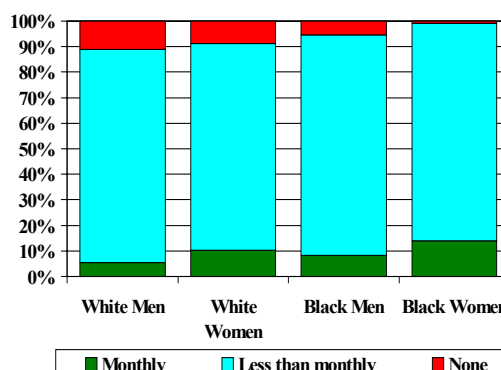
Figure 29. Prevalence of Self-Checking Feet for Sores or Irritations among People with Diabetes, SC, 2000-2001.



Seeing a Health Professional for Diabetes in the Past Year

More than 90% of diabetes reported having seen a health professional for diabetes in the past year, according to the BRFSS survey in 2000-2001. More women visited a health professional for diabetes monthly than did men. There were, however, approximately 10% of whites with diabetes and 5% of black men with diabetes who did not see a health professional in the past year. Among blacks there was marked improvement from 15% BM to 22% BF since the previous Burden Report (1994-97) (Figure 30).

Figure 30. Prevalence of Seeing a Health Professional for Diabetes in Past Year, SC, 2000-2001.



Summary

The major findings in the serial BRFSS analyses have been an alarming increase in diabetic individuals who are overweight or obese, and who have high blood cholesterol and hypertension. These are clearly areas to target in future programs directed toward improving cardiovascular morbidity and mortality in people with diabetes, and improving primary prevention efforts.

Overall, there has been improvement in areas of knowledge of diabetes and access to prevention and intervention services. Short-

term surrogate measures and actions such as HbA1c tests, foot examinations, and eye examinations have been improved in recent years. Continued efforts should emphasize major behavioral risk factor modification, racial and gender disparities in self-blood glucose monitoring, standards of care, accessibility, and affordability of care. Optimal management and treatment of diabetes and prevention of diabetes complications are a high priority of the continued efforts of the SCDHEC DPCP and the DSC.

Chapter Three Morbidity

Introduction

Diabetes frequently leads to complications and co-morbidities. The major complications are diabetic ketoacidosis, blindness, kidney failure, and lower extremity amputation. The most common co-morbidities include coronary heart disease, stroke, hypertension, and peripheral vascular disease. Significant high risk of complications and co-morbidities in diabetes leads to more emergency visits, hospitalizations, increased mortality, decreased quality of life, and increased costs.

Prevalence

The statewide prevalence of diabetes was 8.1% in 2001. Studies have indicated that this figure might account for only two thirds of people with diabetes, and another one third of people with diabetes do not know they have it. It is estimated that there were 257,000 to 342,000 South Carolinians who have diabetes; the number has increased by 17,000 to 42,000 from the estimate in 1998. The prevalence of diabetes was higher among blacks (10.6%) than among whites (7.3%). The prevalence among black men (12.6%) was 73% higher than that among white men (7.3%). The overall prevalence of diabetes increased in the past 14 years, from 5.6% in 1988 to 8.1% in 2001. The prevalence of diabetes fluctuated during 1988 through 1997, and then increased persistently from 1997 to 2001. In addition to increase in overall prevalence, all race-sex specific prevalence increased in the past five years. The most dramatic increase (130%) in the prevalence of diabetes was

observed among black men during 1988-2001 (Figure 31).

Figure 31. Prevalence of Self-Reported Diabetes by Race-Sex, SC 1988-2001.

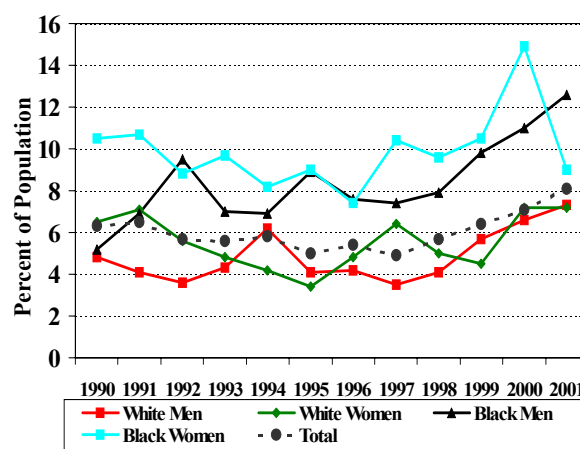
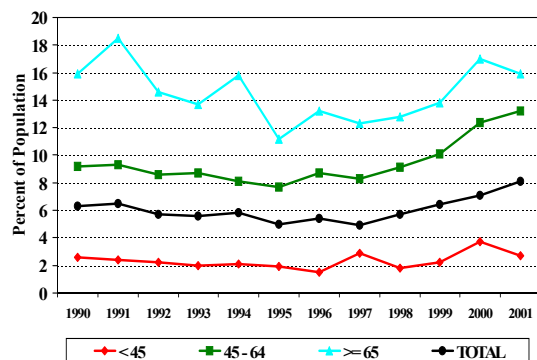


Figure 32 presents the prevalence of diabetes by age groups in 1988 to 2001. The prevalence of diabetes was higher among older people than among younger people. The prevalence of diabetes among people 65 years and older was seven times that of people under age 45. The prevalence tended to increase in all age groups during the past 14 years, except the prevalence among people age 65 and older, which fluctuated probably because of the small sample size in the BRFSS survey.

Figure 32. Prevalence of Self-Reported Diabetes among Adults by Age, SC 1990-2001.



The BRFSS survey asked the survey respondents how old they were when they were diagnosed with diabetes. The vast majority of diabetes is adult-onset diabetes. Nearly half of people with diabetes were diagnosed at age between 45 years and 64 years. Another one-third of people reported that they were diagnosed at age between 18 years and 44 years. Only 4% of people with diabetes reported that they were diagnosed when they were under age 18.

Figure 33. Age of Diagnosis of Diabetes among People with Diabetes, SC, 2000-2001.

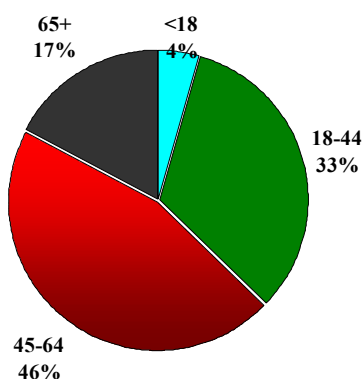
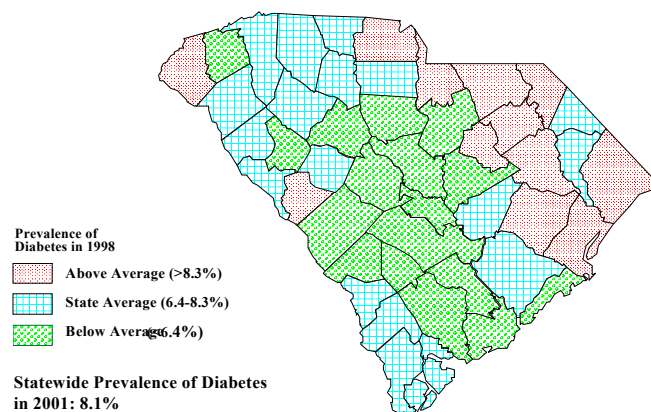


Figure 34 presents geographic distribution of the prevalence of diabetes in South Carolina in 2001. Ten out of 12 counties that had a prevalence of diabetes greater than the state average (8.1%) are those in Pee Dee and Waccamaw districts. Most of the counties with the prevalence lower than the state average are located in the central regions of the state.

Figure 34. Prevalence of Diabetes among Adults, SC, 2001



Hospital Discharges for Diabetes

Number of Discharges

Diabetes poses a significant burden on South Carolina health care systems. In 2001, 8,880 hospital discharges had diabetes as the primary diagnosis (the main reason of hospitalization), and 66,390 discharges had diabetes as a secondary diagnosis (a co-morbidity). Nearly one out of three black inpatients and one out of five white inpatients in South Carolina hospitals had diabetes in 2001.

Patients hospitalized with diabetes accounted for a significant portion of all patients hospitalized in South Carolina hospitals. Figure 35 shows the proportion of patients with diabetes to all inpatients was

higher among blacks than among whites. The proportion increased by age, from less than 5% among patients under age 20, to more than 20% among patients age between 60 and 69.

Figure 35. Proportion of Hospitalizations with Diabetes of All Hospitalizations by Race-Age

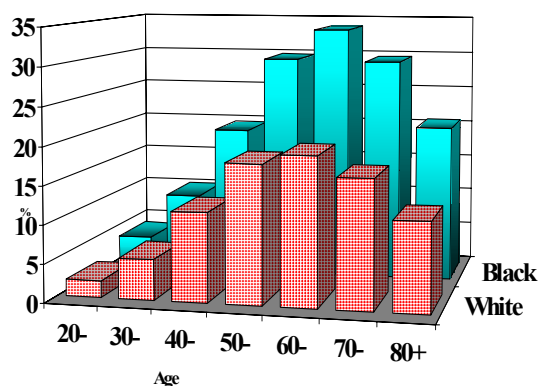
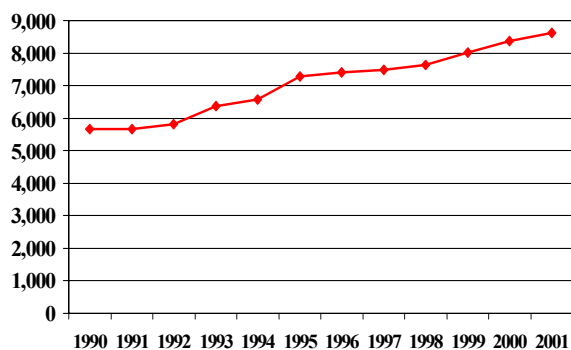


Figure 36 presents the total number of hospitalizations for diabetes as the primary diagnosis in South Carolina during 1987 to 2001. The number of hospitalizations for diabetes increased by 60% during the 14 years, a pace far faster than the increase in South Carolina population.

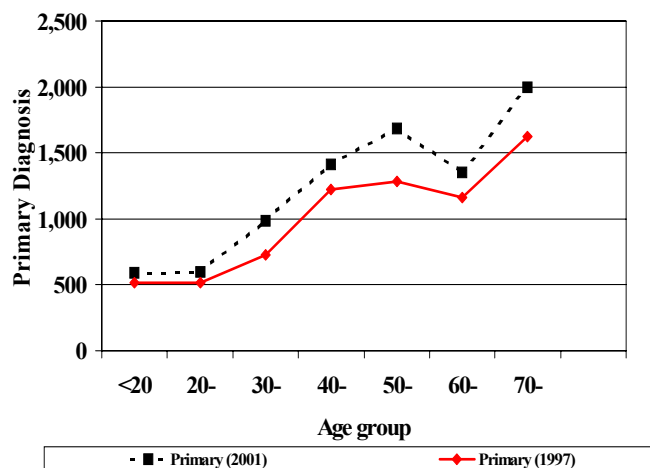
Figure 36. Total Number of Hospitalizations for Diabetes as the Primary Diagnosis, SC, 1987-2001



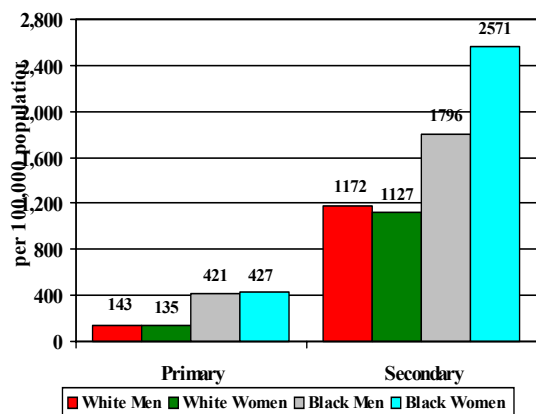
The number of hospitalizations for diabetes increases dramatically with the patient's age.

In 2001, the number of discharges with diabetes as the primary diagnosis among older patients (70 years and older) was 3.4 times that among young patients (under age 20). As diabetes becomes more prevalent among older people, the number of hospitalizations for diabetes as a secondary diagnosis among older patients becomes 88 times the number for young patients. Compared to the data in 1997, the number of hospitalizations for diabetes as the primary diagnosis increased for all age groups in 2001, (Figure 37).

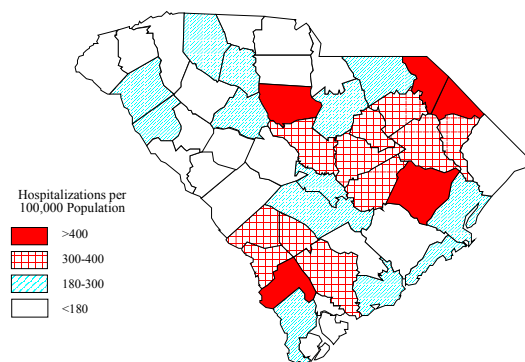
Figure 37. Number of Hospital Discharges with Diabetes by Age, SC, 1997 and 2001



Blacks had a much higher hospitalization rate for diabetes than whites. The rates of hospitalizations with diabetes as the primary diagnosis among blacks were more than 420/100,000; three times the rates among whites. Moreover, the hospitalization rate for diabetes as a secondary diagnosis was disproportionately higher among blacks, especially among black women, than among whites (Figure 38).

Figure 38. Rate of Hospitalizations with Diabetes as Primary or Secondary Diagnosis

Counties that had a high rate of hospitalization for diabetes among their residents are primarily those that are located in the northeastern and southwestern regions of the state, especially in the Pee Dee districts. The data on the counties at the border with North Carolina (such as York, Cherokee, and Lancaster) or with Georgia (such as Aiken and Edgefield) might underestimate the rates of hospitalization for diabetes (Figure 39).

Figure 39. Age-Standardized Rate of Hospitalizations for Diabetes, (Primary Diagnosis), SC, 2001

Hospital Charges

In concordance with the increased number of hospitalizations for diabetes, the total hospital charges for hospitalization for diabetes as the primary diagnosis increased to \$104 million in 2001. The total charges for diabetes hospitalization almost increased \$5.8 million every year, in average, during 1987 to 2001 (Figure 40).

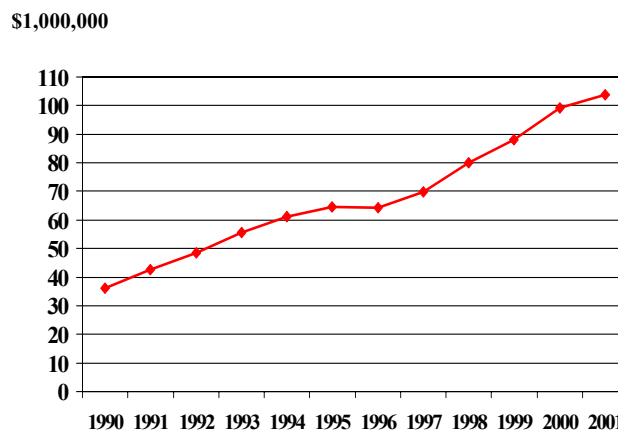
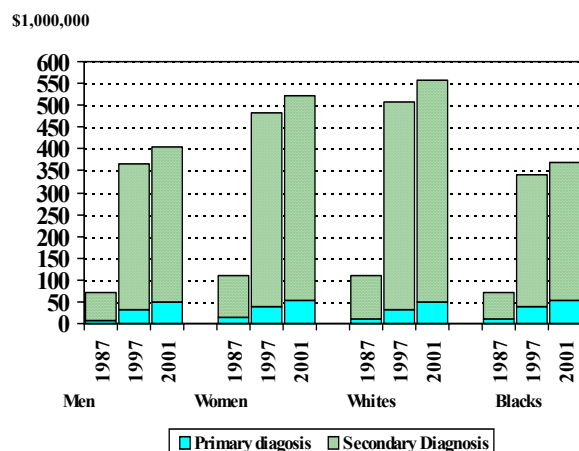
Figure 40. Total Hospital Charges for Hospitalizations for Diabetes as the Primary Diagnosis, SC, 1990-2001

Figure 41 presents the total hospital charge for hospitalizations with diabetes as either the primary diagnosis or a secondary diagnosis in 1987, 1997 and 2001. Both charges for diabetes as either the primary

diagnosis or a secondary diagnosis increased significantly between 1987 and 2001.

Figure 41. Total Charges for Hospitalization among Patients with Diabetes by Race-Sex, 1987, 1997, and 2001*

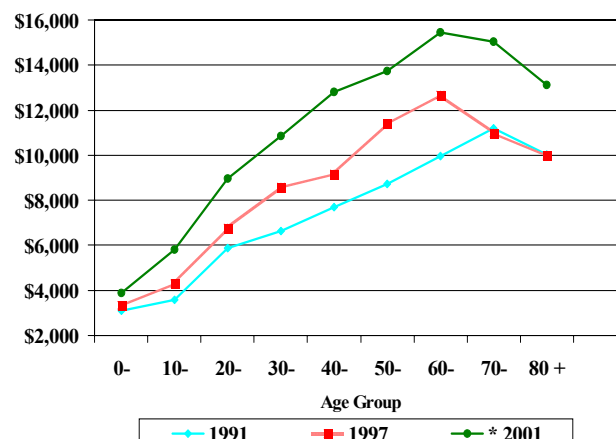


*2001 Hospital data did not include all secondary diagnoses; therefore, charge data may be incomplete.

The total charges for diabetes (as either the primary diagnosis or a secondary diagnosis) were \$928 million in 2001, more than five times the total charges in 1987 (\$183 million).

The increase in total charges for hospitalizations that is presented in Figure 41 was not only attributable to the increase in the number of hospitalizations in the past 14 years as shown in Figure 36, but also to the increase in average charges per hospitalization. Figure 42 compares the average charges in 1987, 1991, 1997 and 2001. In 1997 to 2001, the average charges increased for patients of any age group. The increase in average charges ranged from 155% among patients under age 20 to 255% among patients whose age was between 30 and 39. Figure 41 also illustrates that the average charges increased with patient's age, from \$4,000 for patients under age 10, to more than \$15,000 for patients aged 60 to 69 in 2001.

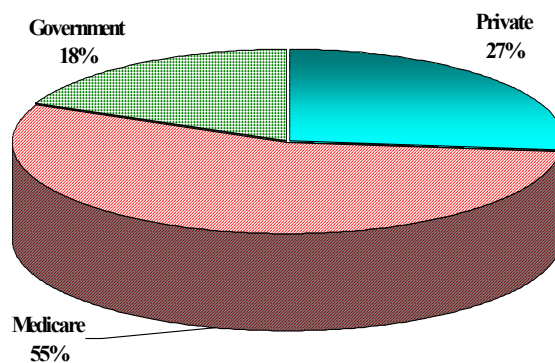
Figure 42. Change in Average Hospital Charge for Diabetes as Primary Diagnosis by Age, SC, 1991-2001*



*2001 Hospital data did not include all secondary diagnoses; therefore, charge data may be incomplete.

Who pays for the hospitalizations for diabetes as the primary diagnosis? Taxpayers paid approximately three quarters of the hospital charges through governmental programs. Medicare alone paid for more than half of the total charges in 2001 (Figure 43).

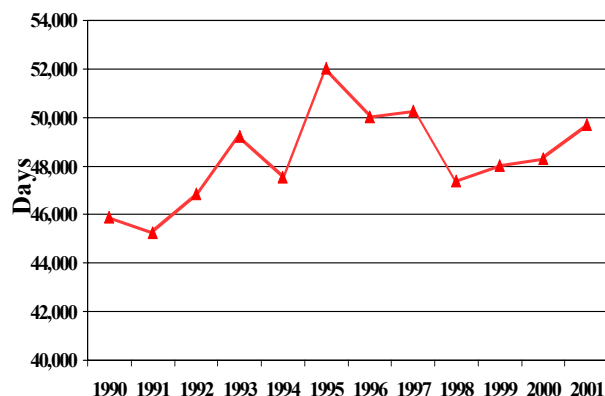
Figure 43. Sources of Payment for Hospitalization among Patients with Diabetes as the Primary Diagnosis, SC, 2001



Length of Hospital Stay

Patients with diabetes as the primary diagnosis stayed in hospitals for a total of 49,710 days (Figure 44). In contrast to a 60% increase in the number of total hospitalizations for diabetes as a primary diagnosis between 1998 and 2001 (Fig. 36), the total length of hospital stay for patients with diabetes only increased by 20%. The total length of hospital stay for diabetes has increased slowly since 1998 after a decline during 1995 to 1998, but remained less than that the number in middle 1990's.

Figure 44. Total Length of Hospital Stay for Patients with Diabetes as the Primary Diagnosis, 1990-2001

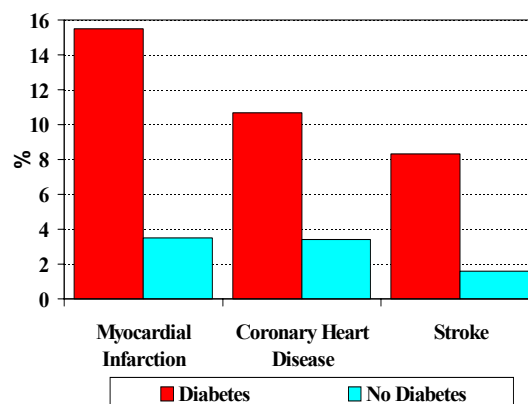


Complications

Diabetes significantly increases the risk of coronary heart disease, especially myocardial infarction, and stroke. The SC BRFSS surveyed South Carolina adults for the prevalence of coronary heart disease, myocardial infarction and stroke in 2000 and 2001. The data show that the prevalence of coronary heart disease among diabetics was triple that of nondiabetics, and myocardial infarction and stroke among people with diabetes were both five times the prevalence among people without diabetes (Figure 45). These data underscore the significance of

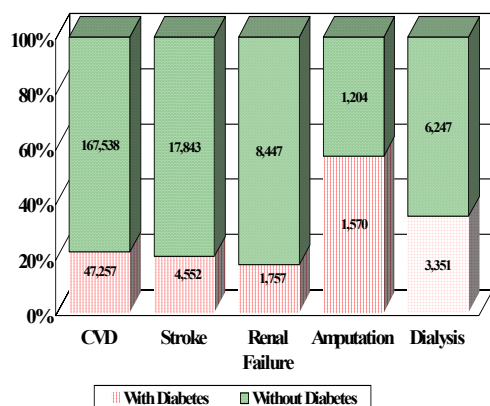
diabetes control and management of cardiovascular risk factors, which will not only lower the diabetes morbidity and mortality, but also contribute to prevention of cardiovascular diseases, the leading cause of death in South Carolina.

Figure 45. Prevalence of CVD and Stroke by Diabetes Status, SC, BRFSS 2000-2001



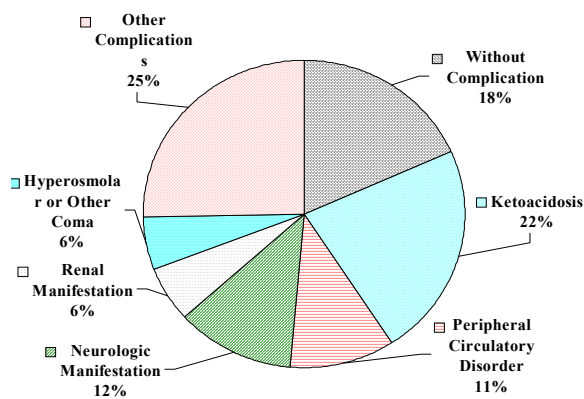
Hospital discharge data show that diabetes is a major cause of cardiovascular disease (not including stroke) and stroke. Figure 46 shows that among all patients hospitalized for cardiovascular disease and stroke, approximately 20% to 22% of patients had diabetes, a proportion that is significantly higher than the proportion of people with diabetes in general population. In addition to cardiovascular disease and stroke, patients with diabetes accounted for 17% of patients with renal failure and 35% of patients who underwent dialysis. Patients with diabetes comprised the majority of patients hospitalized for lower extremity amputation(s) in 2001. Fifty-seven percent of patients with lower extremity amputations were patients with diabetes, more than five times the frequency of people with diabetes in the general population.

Figure 46. Number of Hospitalizations for Major Diseases & Procedures by Diabetes Status, SC, 2001



Four out of five (82%) patients hospitalized for diabetes had diabetes complications in 2001. Ketoacidosis (22%), resulting from failure of glycemic control, remained the most common acute complication. Neurological manifestation was the second most common complication and was the diagnosis for 12% of patients with diabetes. Peripheral circulatory disorder, or loss of blood to the extremities (a complication associated with lower extremity amputation) was the complication among 11% of patients with diabetes. Other major complications include: 6% with renal manifestation, 6% with hyperosmolar coma or other coma, and 25% with a variety of other complications. The following set of figures present specific patterns for the most common complications of diabetes (Figure 47).

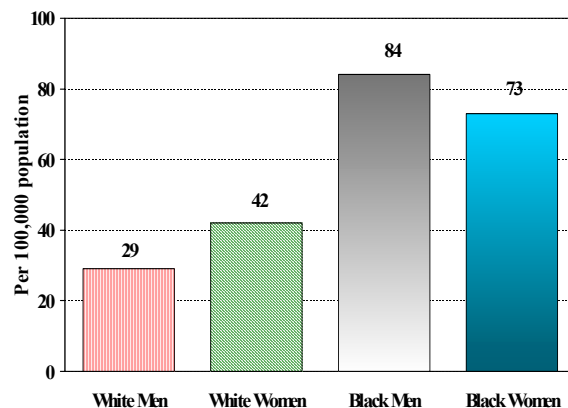
Figure 47. Distribution of Complications among Inpatients with Diabetes as Primary Diagnosis, SC, 2001



Diabetic Ketoacidosis

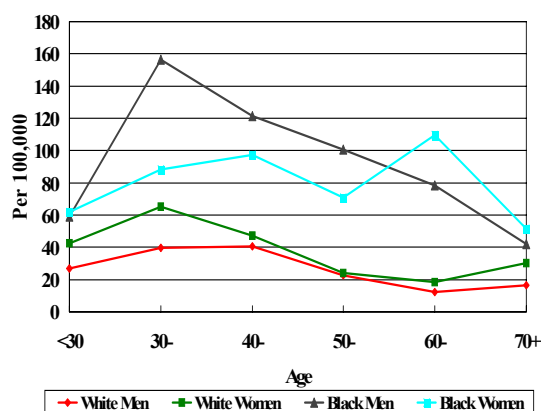
Ketoacidosis is a serious crisis for persons with diabetes, with high blood glucose, ketonemia and metabolic acidosis. Ketoacidosis is one of the most common acute complications seen among diabetes patients. Figure 48 shows the race-sex specific age-adjusted rate of hospitalization with Ketoacidosis. Blacks had a rate of hospitalization more than two times the rate among whites. Among four race-sex groups, black men had the highest rate (84/100,000) in 2001.

Figure 48. Age-Adjusted Hospitalization of Diabetic Ketoacidosis by Race-Sex, SC, 2001



The rate of hospitalization with ketoacidosis varies by patient's age. Figure 49 shows the age-specific rate of hospitalization with ketoacidosis by race and sex. Blacks had a higher rate than did whites for all age groups. Black men had the highest rates among patients under age 55 years. The age-specific rate was high among patients age between 30 and 39, and declined by patient's age for white men, white women and black men. Rates among black women appeared to peak among patients age between 60 and 69.

Figure 49. Age-specific Hospitalization Rates of Diabetic Ketoacidosis by Race-Sex, SC, 2001



Diabetic Renal Failure and Dialysis

Renal failure (end-stage renal disease) is another very common manifestation of diabetes. After years of hyperglycemia accompanied with hypertension, diabetic nephropathy may lead to renal failure that requires lifelong dialysis or kidney transplantation. The rate of hospitalization for renal failure was disproportionately higher among blacks with diabetes than the rate among whites with diabetes. Figure 50 shows that black women with diabetes had the highest rate of hospitalization for diabetic renal failure in race-sex groups,

which was more than three times the rate among white women with diabetes.

Figure 50. Age-Adjusted Hospitalization Rate of Diabetic Renal Failure by Race-Sex, SC, 2001

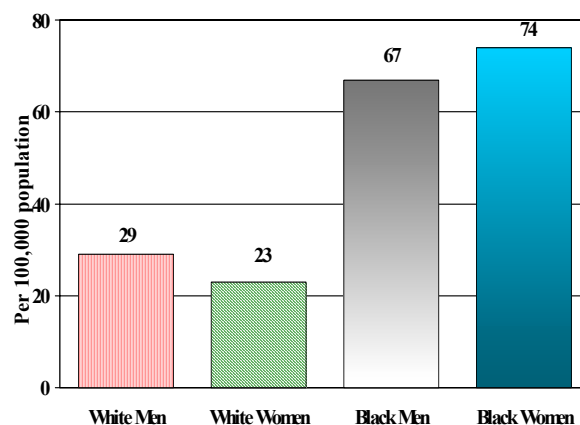


Figure 51 illustrates the pattern of the rate of hospitalizations for diabetic renal failure by age. The rate increased with patient's age in 2001. Almost two-thirds (63%) of hospitalizations for diabetic renal failure were for patients age 60 years and older. Dramatic increase in the rate of hospitalization for diabetic renal failure was observed among patients age 40 years and older. Blacks had a higher age-specific rate than the rate for whites. The racial disparity of the rate of hospitalization for diabetic renal failure widened with age, especially among patients age 60 and older. There was little gender difference in the age-specific rates, except that among old patients (age 70 years and older).

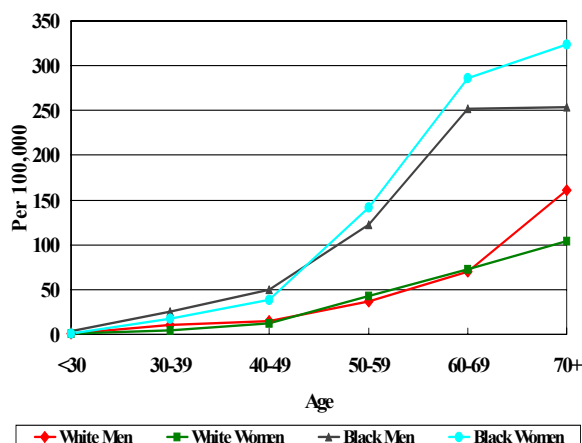
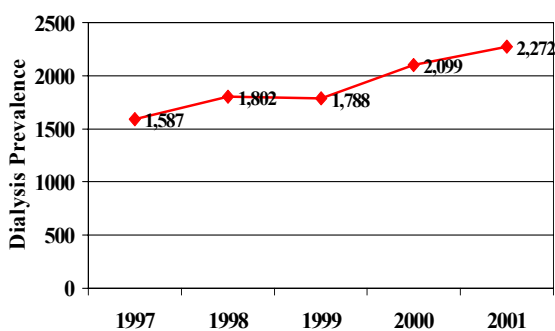
Figure 51. Age-Specific Hospitalization Rate of Diabetic Renal Failure by Race-Sex, SC, 2001

Figure 52 presents the total number of patients with diabetes on dialysis in South Carolina, based on data collected by the Southeastern Kidney Council. The number of patients with diabetes on dialysis has increased by 43% since 1997.

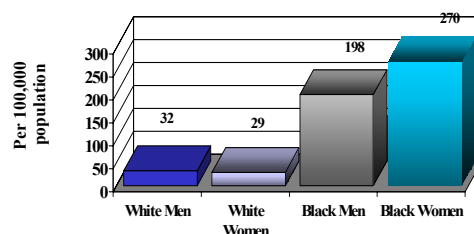
Figure 52. Dialysis Prevalence with Diabetes as Major Diagnosis, SC, 1997-2001.

Based on Data from Southeastern Kidney Council

The vast majority of renal dialysis is now taking place in freestanding dialysis centers scattered around the state, and very little is taking place on an inpatient basis, except where the patient has been hospitalized for another reason.

Blacks had a rate of hospitalization for diabetic dialysis higher than whites. The

rate among black men was six times the rate among white men, and black women had a rate nine times the rate among white women (Figure 53).

Figure 53. Age-Adjusted Hospitalization Rate of Diabetic Dialysis by Race-Sex, SC, 2001

Diabetic Lower Extremity Amputation

The hospitalization rate for diabetic lower extremity amputation was disproportionately higher among black males than among black females or whites of either sex. In 2001, the rates among black males were 50% higher than rates in black females or white males, and four times the rates among white females, who consistently had the lowest rates (Figure 54). One very encouraging trend that has occurred is a fall in hospitalization rates for lower extremity amputation in people with diabetes from 39/1000 to 21/1000 diabetes patients (45%) between 1997 and 2001. This is consistent among racial and gender groups. The age-specific rates increase with advancing age, especially among blacks (Figure 55).

Figure 54. Hospitalization Rate of Diabetic Lower Extremity Amputation by Race-Sex, SC, 1997-2001

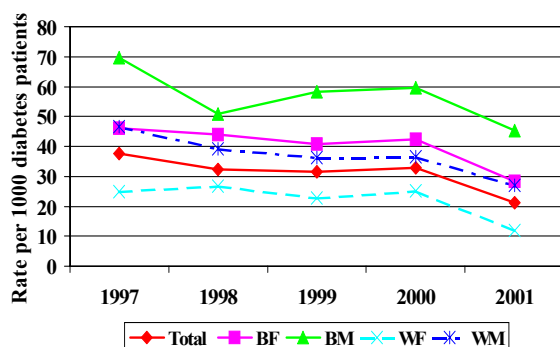
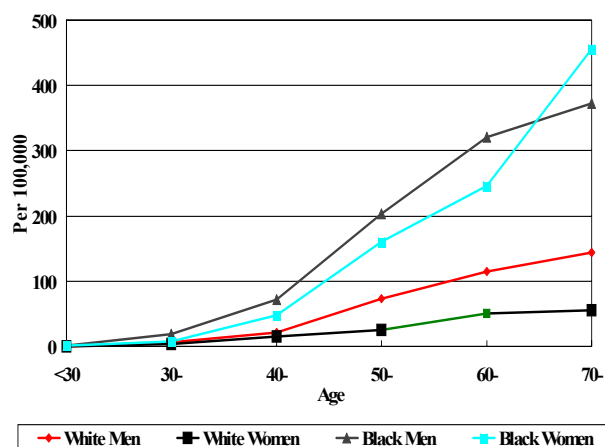


Figure 55. Age-Specific Hospitalization Rates for Diabetic Foot Amputation by Race-Sex, SC, 2001



Gestational Diabetes

Gestational diabetes is associated with infant mortality, congenital malformations and complications of labor and delivery. In general, two to three percent of pregnant women are diagnosed with gestational diabetes. According to South Carolina Vital Statistics, approximately 1,700 to 1,900 pregnant women are diagnosed with gestational diabetes each year. Figure 56 shows the number of live births to mothers with gestational diabetes in 1990 to 2001.

There were 1,951 live births to mothers with gestational diabetes in 2001. The percentage of live births to mothers with gestational diabetes was 3.5 percent of live births in 2001, increased from 2.5 percent in 1990.

Figure 56. Number of Live Births by Mother's Diabetes Status, SC, 1990-2001

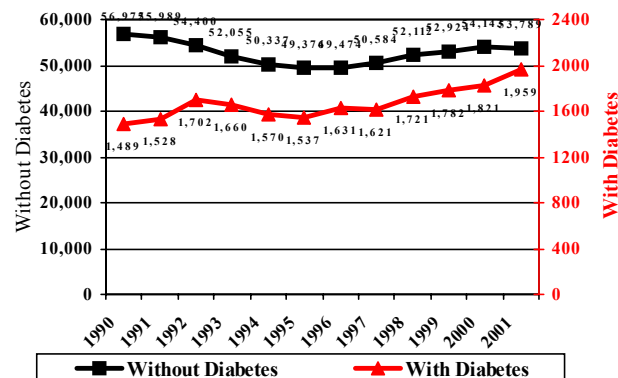
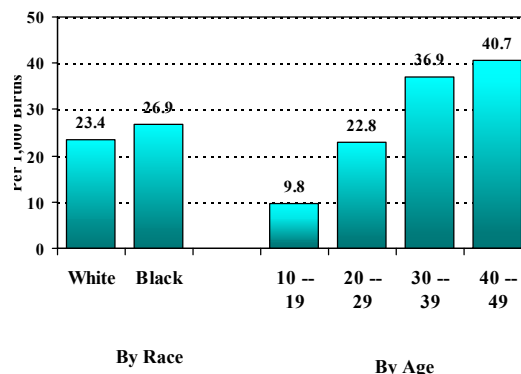


Figure 57 illustrates that the rate of hospitalization for gestational diabetes was slightly higher among blacks than among whites, and increased with age of pregnant women. The rate of hospitalization for gestational diabetes among women age 40 years and older was almost four times the rate among women under 20 years of age.

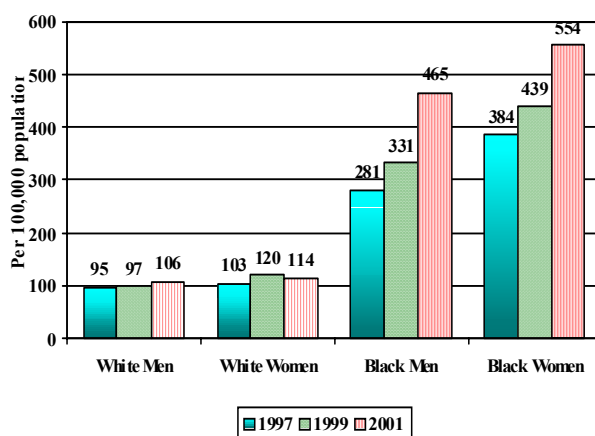
Figure 57. Age-Adjusted Hospitalization Rate of Gestational Diabetes, SC, 2001



Emergency Room Visits

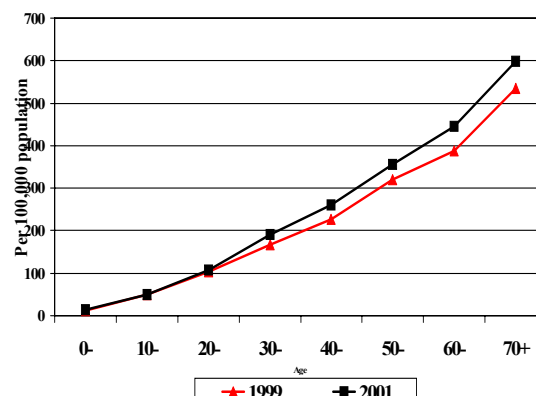
There is a striking racial disparity in the rates of emergency room visits for diabetes. In 2001, the rate of emergency room visits for diabetes as the primary diagnosis among blacks was more than five times the rate among whites (Figure 58). Compared to the data in 1997, the rate of emergency room visits increased among blacks and the racial disparity in the rate of emergency room visit broadened in 2001.

Figure 58. Age-Adjusted Rate of ER Visits for Diabetes as the Primary Diagnosis by Race-Sex, SC, 1997-2001



The rate of emergency room visits for diabetes increases with age. The rate was the highest (599/10,000) for patients age 70 and older. The age-specific rate among patients age 30 years and older increased significantly during 1999 and 2001 (Figure 59).

Figure 59. Rates of ER Visits with Diabetes as the Primary Diagnosis by Age, SC, 1999 and 2001



The rate of emergency room visits for diabetes varied among 46 counties in South Carolina (Figure 60). Fifteen counties that had a rate of emergency room visits for diabetes greater than 300/100,000 in 2001 are located in an area situated from the northeastern part of the state to the southwestern area of the state. The majority of counties with a high rate of emergency room visits have a high prevalence of diabetes and/or a high proportion of minorities in their populations.

Figure 60. Age-Standardized Rate of ER Visits for Diabetes, (Primary Diagnosis), SC, 2001

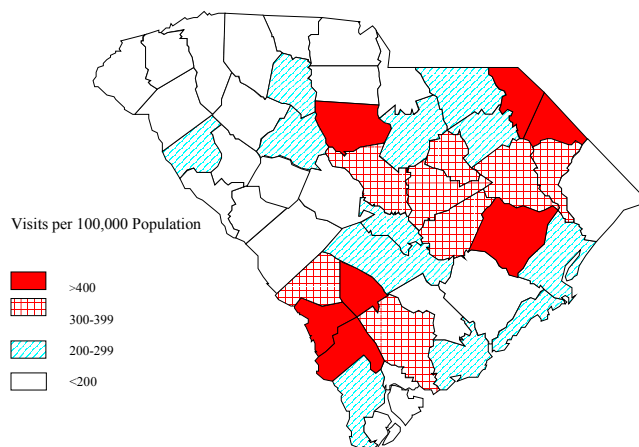
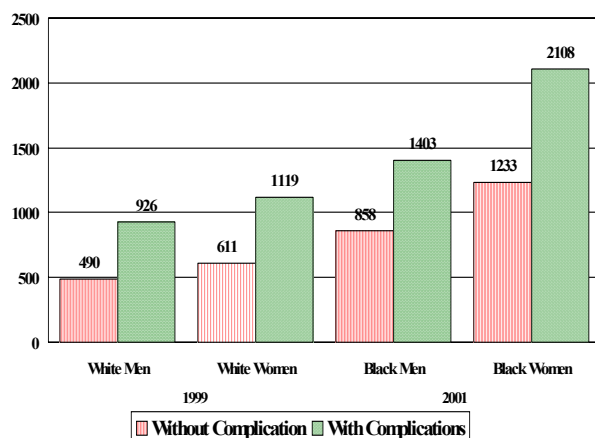


Figure 61 presents the number of emergency room visits for diabetes, both with and without diabetes complications. Women had more emergency room visits for diabetes than did men, and blacks had more visits than did whites. Approximately two thirds of patients who visited emergency room for diabetes had diabetes complications.

Figure 61. Number of ER Visits with Selected Diabetic Complications by Race-Sex, SC, 2001



Repeated Emergency Room Visits for Diabetes

Repeated emergency room visits for diabetes is an indicator of patient's lack of diabetes care and/or lack of access of health care. Repeated ER visits are preventable through appropriate diabetes management and patient education. In 1999, a total of 917 patients visited the emergency room more than once for diabetes (Figure 62). Forty-seven patients even visited the emergency room for five or more times in 1999. The number of patients with repeated ER visits for diabetes increased by 42%, from 647 in 1996 to 917 in 1999.

Figure 62. Number of Patients with Multiple ER Visits for Diabetes as Primary Diagnosis, SC, 1996 and 1999

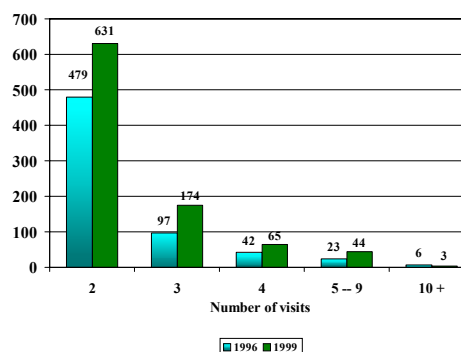
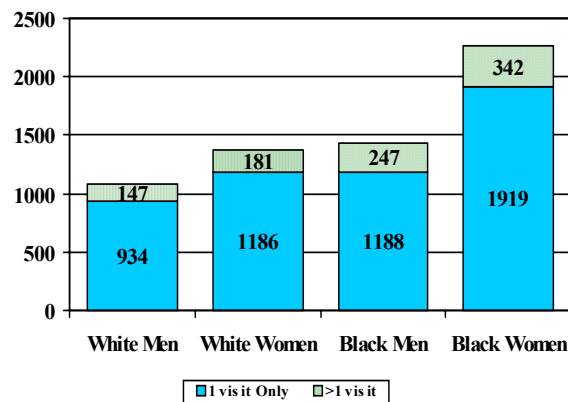


Figure 63 compares the patterns of single ER visits versus repeated ER visits among race-sex groups. More women made repeated ER visits than did men, and more blacks made repeated ER visits than did whites. Black women had the greatest number of both single visit and repeated visits than any other race-sex group.

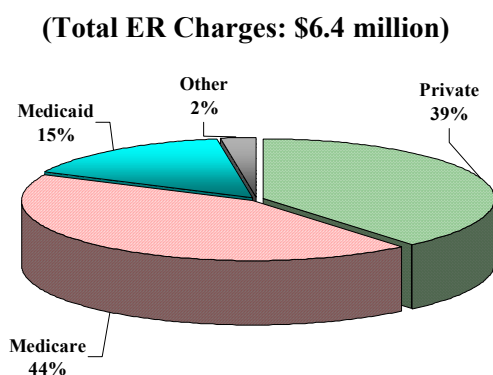
Figure 63. Number of Patients with One or Multiple ER Visit(s) for Diabetes as Primary diagnosis by Race-Sex, SC, 1999.



Since repeated ER visits are mostly preventable, charges for repeated ER visits impose an avoidable financial burden on payers. The total charges for repeated ER visits was \$6.4 million in 2001. Figure 64

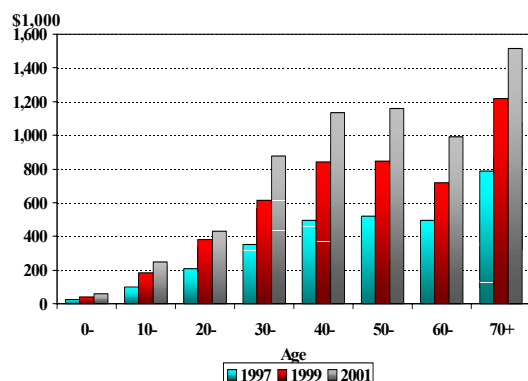
shows that nearly 60% of this cost was paid by tax payers through Medicare and Medicaid in 2001.

Figure 64. Sources of Payment for Diabetic Patients with Multiple ER Visits, SC, 2001



Total hospital charges for emergency room visits for diabetes increased with patient's age. The age-specific total charges increased from \$306,000 for patient age under 20 years to \$1.5 million for patient age 70 years and older. Figure 65 compares the age-specific hospital charges in 1997 to 2001. The total charges increased approximate 115% from 1997 to 2001. In addition, all age-specific charges increased by anywhere from 92% to 152% between 1997 and 2001.

Figure 65. Total Charges for ER Visits with Diabetes as the Primary Diagnosis by Age, SC, 1997-2001



Summary

The prevalence of diabetes in South Carolina has been increasing and at 8.1%, it is among the highest in the country. Prevalence increases with age. Total numbers of hospital discharges with a primary diagnosis of diabetes are increasing. Total hospital charges for diabetes also have been increasing, and in 2001 were \$928 million. Average hospital charges are also increasing, and highest charges are seen in those over age 50. Medicare paid for over half of total charges in 2001. Length of hospital stay has changed very little in recent years. The prevalence of myocardial infarction and stroke are increased 5-fold among people with diabetes in South Carolina. Hospitalization rates for renal failure are more than doubled among blacks when compared with whites. Dialysis prevalence among diabetics has increased 43% in 5 years.

A problem area is the increasing use of the emergency room for diabetes visits over the past four years. In 2001, the rates among blacks were more than 5 times those of whites. Diabetic patients with ER visits increased by 46% between 1996-99. Total charges for ER visits by people with diabetes rose 115% between 1997 and 2001. Total charges in 2001 were \$6.4 million, 44% were Medicare and 15% Medicaid.

In summary, we have a major problem in caring for people with diabetes in South Carolina. A major factor is the increasing prevalence of the disease, which may be primarily due to an alarming increase in overweight or obese people to 65% of our South Carolina population. Hospital charges are close to \$1 billion each year and there has been an increasing use of the emergency room for care.

A very encouraging trend is the more than 40% decrease in hospitalization for lower extremity amputations. This may be a direct result of aggressive efforts to educate

persons with diabetes on foot care and the importance of regular foot exams, both self-checks and by their health care providers

Chapter Four Mortality

Introduction

Diabetes is listed as the sixth leading cause of death in South Carolina. In addition to death from acute complications, diabetes increases the risk of death from cardiovascular disease and end-state renal disease. Although increased death rates are seen for all ages and races, minority populations and older populations experience the highest rates. The mortality data in this chapter are based on information listed on death certificates, and may underestimate the burden of diabetes because diabetes is likely to be under-reported on death certificates, according to previous studies.

Mortality Rates

Mortality

A total of 1,089 South Carolinians died from diabetes in 2001. Figure 66 shows that the age-adjusted mortality for which diabetes was the underlying cause of death increased between 1990 and 1995, and has remained around the rate of 30/100,000 since 1996. Blacks had a mortality rate of 54/100,000 in 2001, more than 2.5 times the rate of 21/100,000 for whites. Men had a mortality rate 22% higher than that among women. During 1990 to 2001, the mortality of diabetes increased by 15% for both whites and blacks. However, men experienced greater increase in mortality (28%) than women (4%) during 1990 to 2001 (Figure 67).

Figure 66. Age-Adjusted Mortality Rate for Diabetes as the Underlying Cause of Death, SC, 1990-2001

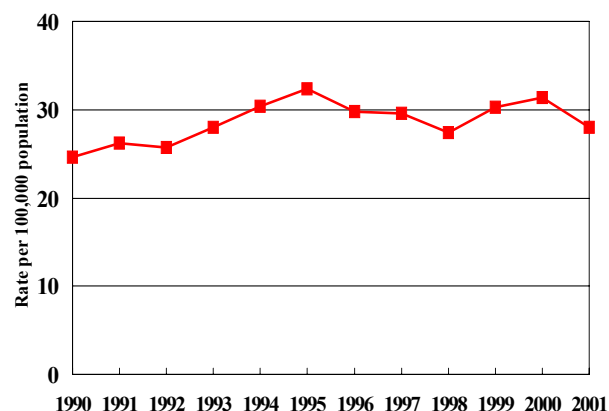
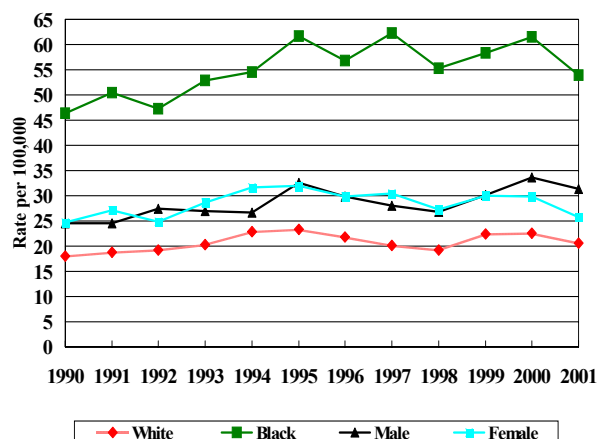
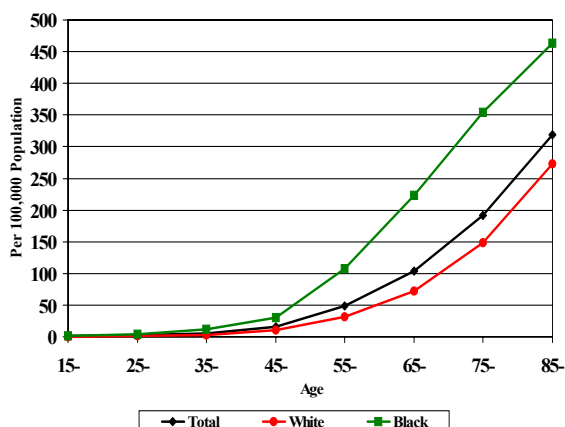


Figure 67. Standardized Mortality Rates for Diabetes as the Underlying Causes of Death by Race, Sex, SC, 1990-2001



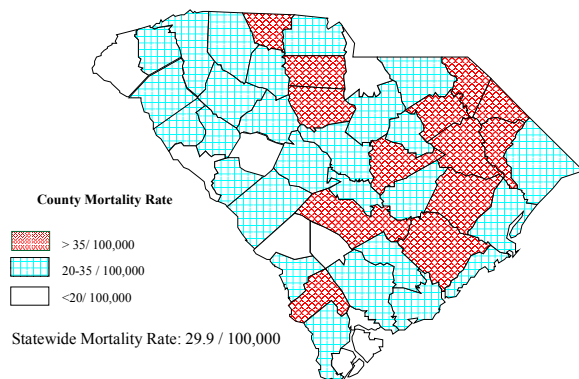
The age-specific mortality increases with age (Figure 68). Mortality rate almost doubled for every age group.

Figure 68. Age-Specific Mortality Rate of Diabetes as the Underlying Cause of Death, SC, 2001



The state average mortality rate was 29.9/100,000 in 2001. Thirteen counties had an age-adjusted mortality higher than the state average and seven counties had a mortality rate lower than the state average. Most of the counties with high mortality are located in a cluster of counties in the Pee Dee area (Figure 69). This is a pattern consistent with that for risk factors, prevalence of diabetes and hospitalizations for diabetes.

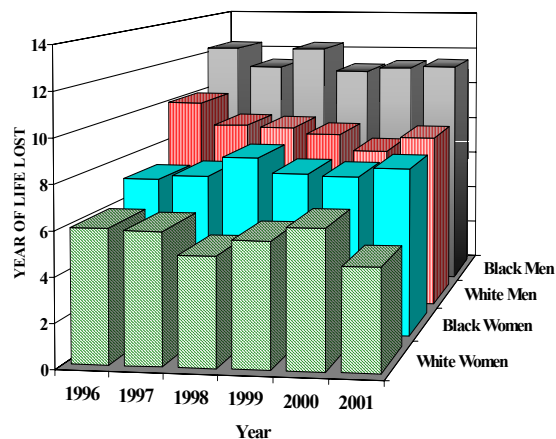
Figure 69. Age-Adjusted Mortality of Diabetes (Underlying Cause of Death), SC, 1999-2001



Years of Potential Life Lost

Average life expectancy for people with diabetes is five to 10 years less than for people without diabetes. Years of potential life loss (YPLL) is calculated by adding all the years of life for people with diabetes who died before normal life expectancy (70 years for men and 76 years for women). Figure 70 illustrates the YPLL due to diabetes from 1996 to 2001. In 1996-2001, 6,368 South Carolinians died from diabetes, which was listed as the underlying cause of death, with a total of 50,300 potential years of life loss. In average, life expectancy for people with diabetes in South Carolina was 7.9 years less than the “normal” life expectancy. Among people with diabetes, men might have lost more years of potential life than did women, and blacks potentially lost more years than did whites.

Figure 70. Average Number of Years of Potential Life Lost for Diabetes as Underlying Cause of Death by Race-Sex, SC, 1996-2001



Summary

Approximately three thousand South Carolinians die from diabetes every year. Diabetes-related mortality appeared to decline in 1995-1997 after a decade long

increase in South Carolina. Data in South Carolina indicated that mortality of diabetes increased exponentially with age. The majority (82%) of deaths from diabetes occurred among people aged 60 and older. Race-sex specific mortality tracked closely with the patterns of diabetes-related risk factors and morbidity. Minorities, predominantly Blacks, experienced a substantially higher death rate and greater years of potential life lost than whites.

Appropriate, innovative communication and education programs are needed to reduce the tremendous burden in this population. Meanwhile, increasing awareness, access to care, and diabetes management are critical for people with diabetes. Increasing resources of diabetes control in South Carolina, particularly rural health settings, targeting high-risk populations are objectives of DSC and SCDPCP.

Part II

Diabetes Initiative of South Carolina

Strategic Plan Progress Report

Chapter One

Progress On Goals

The DSC was established by legislative action in July 1994. The DSC includes a board of directors and three councils: Diabetes Center, Outreach, and Surveillance. The Board and Councils have liaisons with the SCDPCP and the American Diabetes Association. The DSC is home-based at the MUSC and works closely with the University of South Carolina, the ORS for the Budget and Control Board, Carolina Medical Review, SC DHEC Bureau of Epidemiology, and SC DHEC Office of Public Health Statistics and Information System.

The missions of the DSC are to:

- Provide education about diabetes and its complications to the general public, individuals with diabetes, health professionals, and health care systems.
- Develop community-based programs to promote life-style change to prevent or delay the onset of diabetes and its complications.
- Provide ongoing epidemiological information and surveillance of diabetes and its complications.
- Work with other organized groups to improve outcomes for diabetes and its complications.
- Conduct research on selected clinical issues in diabetes.

DSC Diabetes Center Council

The DSC Diabetes Center of Excellence is established at the Medical University of South Carolina. The center shall develop and implement programs of professional education, specialized care and clinical research in diabetes and its complications, in accordance established by the DSC Board. The Center's activities are overseen and directed of the Center of Excellence advisory Council. The purpose of the Council is to:

- Review programs in professional education, specialized care, and clinical research developed by the center.
- Assist in the development of proposals for grant funding for the center's activities.'
- Prepare an annual report and budget proposal for submission to the DSC Board.

DSC Outreach Council

The DSC Outreach Council is charged with overseeing and directing efforts in patient education and primary care including:

- Promoting adherence to national standards of education and care.
- Ongoing assessment of patient care, costs, and reimbursement issues for persons with diabetes in South Carolina.

- Preparing an annual report and budget proposal for submission to the DSC Board.

DSC Surveillance Council

The Surveillance Council was established in 1995 to develop and implement a state-of-the-art system for the assessment of diabetes in South Carolina, and to provide a mechanism to evaluate interventions and control programs. The Council consists of diabetes care providers, epidemiologist, program specialist and researchers, and is staffed by data specialists at the SC DHEC and the MUSC. The Council operates with formal meetings and communications.

The Council has established the following objectives:

- Develop, implement and evaluate surveillance protocols and methodologies to assess diabetes awareness and knowledge, prevalence of diabetes, access to primary care, quality of diabetes self-management, and utilization of monitoring guidelines.
- Evaluate patient and professional education programs.
- Develop and maintain a mechanism to analyze mortality, morbidity, hospitalization and survey data in production of reports to describe the burden of diabetes in South Carolina.
- Develop, establish and maintain a registry of diabetic individuals with blindness.
- Analyze the effects of co-morbidities with diabetes.
- Establish and maintain an ongoing evaluation of the role of insurance and managed care companies in control of diabetes.
- Function as a central unit composed of multiple organizations and disciplines involved in the surveillance of diabetes in South Carolina.
- Function as a data and information resource for DSC, DPCP, and Carolina Medical Review other organizations involved in diabetes control.
- Develop and maintain an Internet Website for distribution of information regarding diabetes in South Carolina.
- Establish a scientific forum to showcase diabetes research and projects in South Carolina.
- Establish a methodology to estimate the prevalence of diabetes in South Carolina based on clinical data.
- Establish a methodology to assess trends in diabetes-related outcomes and clinical practices.

DSC Strategic Plan

In 1998, the Board of Directors of the Diabetes Initiative of South Carolina approved a 10 Year Strategic Plan, which defined and quantified specific goals and objectives which would materially reduce the burden of diabetes in South Carolina. The report was developed by a widely representative committee and was reviewed and modified by Board members and critical organizations and agencies that deal with diabetes and its complications. The SC DHEC and DPCP were closely involved in developing the plan, and continues to work closely with the DSC in assuring its implementation. Some portions of this Burden Report serve as monitors for the Plan. The DSC has nine long-range goals:

1. Improve knowledge of diabetes, quality of life, and access to prevention and intervention services.
2. Increase utilization of short-term measures and actions.
3. Increase services and education in health professional shortage areas.
4. Reduce morbidity and disability.
5. Reduce (age-adjusted) mortality rates
6. Target high-risk groups.
7. Decrease preventable hospital admissions and charges.
8. Decrease preventable emergency room visits.
9. Improve statistical basis for estimating prevalence of diabetes and its complications.

DSC Long-Range Plan, Goals and Aims

In its 10-year (1998-2008) strategic plan, the DSC defined nine long-range goals for its mission. This report, as part of the joint effort between the DSC and SCDPCP to assess the burden of diabetes, prepares data for monitoring the progress of achieving these goals.

- Healthier lifestyles: nutrition, exercise, weight control

- Risk factor awareness: prevention, signs/symptoms of diabetes and complications
- Improve access to preventive services, screening and ongoing care: formalized
- Systematic care and education
- Improve self-management: use of key monitoring guidelines by persons with diabetes
- Expand financing: insurance and managed care coverage for education and care

The Board of Directors of the Diabetes Initiative of South Carolina is currently examining progress towards these goals at the Five-Year-Mark (2003) of its Ten-Year Strategic Plan (1998-2008). Much of the data obtained in serial Burden of DSC reports will be used in monitoring progress. Some of the problematic as well as encouraging trends are seen in this Burden Report.

A separate Progress Report directed specifically at the Strategic Plan will be prepared by the Councils of the Diabetes Initiative and presented to the Board for review and approval. This report will be complementary to the 2002 Burden of Diabetes in South Carolina report.

Chapter Two Data Resources

Today, there are multiple organizations, agencies, and programs that are working to decrease the burden of diabetes in South Carolina. The purpose of this section is to outline diabetes data resources in South Carolina. It should be noted that these efforts are not all inclusive and the compilation of a more complete catalog of resources in South Carolina is ongoing. Anyone wishing to provide information in order to make the resources catalogue more inclusive can send contributions to the following address:

**SC DHEC Bureau of Epidemiology,
Division of Surveillance and Program
Support**

Patsy Myers, DrPH
SC DHEC
1777 St. Julian Place
Columbia SC 29204
(803) 545-4490

**Statewide Agencies that Provide
and Interpret Data for Use in
Monitoring the Burden of Diabetes**

**Diabetes Prevention and Control
Program**

Rhonda L. Hill, PhD, CHES
Diabetes Prevention and Control Program
SC DHEC
1777 St. Julian Place
Columbia, SC 29204
(803) 545-4490

The SCDPCP is housed and managed within the SC DHEC, Bureau of Chronic Disease Prevention and Health Promotion.

The Program is administered by a core staff comprised of a Program Director/Coordinator, Epidemiologist, Intervention/Evaluator, Health Systems Coordinator, Lay Health Facilitator, Statewide Coalition Coordinator, and an Administrative Assistant, and is funded by the Centers for Disease Control and Preventions (CDC).

The overall goal of the program is to reduce the burden of diabetes in South Carolina. The objectives include:

- Defining and monitoring the burden of diabetes in South Carolina (Surveillance);
- Developing new approaches to reduce the burden of diabetes;
- Implementing specific approaches to reduce the burden; and
- Coordinating and integrating efforts to reduce the burden.

Diabetes Initiative of South Carolina

John Colwell, MD, PhD, CDE
Chairman of Board
Medical University South Carolina
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Charleston, SC 29425
843-876-0968
Web site address:
<http://www.musc.edu/diabetes>

**SC DHEC Bureau of Epidemiology,
Division of Surveillance and Program
Support**

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SC DHEC
1777 St. Julian Place
Columbia SC 29204
(803) 545-4490

Established in 1998, within the new Bureau of Epidemiology, the DSPS is comprised of several specialized epidemiologists and graduate assistants from the USC School of Public Health. Emphasis programs include diabetes, cardiovascular disease, and risk factor reduction. A close collaboration with the South Carolina Central Cancer Registry provides a capacity for cancer epidemiology as well. The Branch performs directed analyses in support of the chronic disease control programs of SC DHEC. The Division staff also responds to requests for data analyses from the SC DHEC district staff, health officials, and the public. DSPS leads the development of a variety of publications, and assists with the construction of others. Statistical analyses, interpretation, and synthesis are principal capacities. DSPS database assets include vital records, hospital discharges, emergency room visits, BRFSS, demographic statistics; along with considerable graphic and mapping capacities. The Branch is the single point of contact for DHEC with disease cluster reports and small area investigations. The Branch is active with research programs from the medical schools and larger universities of the state.

Carolina Medical Review

Nelson Gunter, MD
250 Berry Hill Road
Suite 101
Columbia, SC 29210
803-731-8225

As a private, non-profit organization, Carolina Medical Review (CMR) is the Peer Review/Quality Improvement Organization for South Carolina. Funded by the Health Care Financing Administration, CMR assures that South Carolina's Medicare beneficiaries receive medically necessary health services furnished in the appropriate

setting and that the quality of care provided meets professionally recognized standards of health care.

South Carolina Primary Health Care Association

2211 Alpine Rd.
P. O. Box 6923
Columbia, SC 29223
803-788-2778

The SCPHCA was formed in response to a need to make health care services available in medically underserved areas of South Carolina. The mission is to assure that adequate and appropriate quality health care services are accessible and affordable to every South Carolina community.

SCPHCA membership offers opportunities to network with other people, agencies, governmental officials, and health centers to develop strategies, policies and programs that lead to the effective delivery of primary health care. The SCPHCA provides services such as: advocacy, research, information sharing, continuing education and training, shared services arrangements, technical assistance, training and consultation, project collaboration, policy monitoring and analysis, grant preparation assistance, clearinghouse activities, community development, and contract negotiations.

South Carolina Health Alliance

Post Office Box 6009
West Columbia, SC 29171-6009
803-796-3080

The South Carolina Health Alliance is a private, not for profit organization. It is made of 1,000 member hospitals and health systems and about 900 personal members associated with our institutional members. To facilitate the continuous improvement of

South Carolina's health status by representing and advocating; leading change; mediating problems; and providing a forum for ideas.

**South Carolina Budget and Control
Board Office of Research and Statistics
(ORS)**

The Health and Demographics Section of the Office of Research and Statistics receives, processes, distributes, and interprets health, demographic, and census data in South Carolina.

The Health Information maintained by the Health and Demographics Section includes: Medical record and billing data on inpatient hospital discharges, emergency room visits, and outpatient surgery; Inpatient health facilities; The South Carolina Client Master File; Licensed Health Manpower, Health Manpower Education; And periodic estimates of visits to private office physicians. Much of this data is presented on this website.

Addressing & Geocoding provides a means to understand and improve the distribution of limited resources by processes known as address matching and geocoding. Address matching integrates client databases, and geocoding pinpoints client locations on a map. When combined spatially, this information optimizes neighborhood communication between clients and service providers and also improves cooperation between agencies serving the same areas and clients. Much of this data is presented on this website

The Health and Demographics Statistical Section is the designated State Data Center for census information and acts as the coordinating unit for census information in the State. Census products include not only

information from the Decennial Censuses but also from the Economic and Government Censuses and the County Business Patterns. Much of this data is presented on this website.

**Behavioral Risk Factor Surveillance
System**

CDC's BRFSS is a unique, state-based surveillance system active in all 50 states. This system is the primary source of state-based information on risk behaviors among adult populations. The system involves a lengthy survey questionnaire administered by phone.

The BRFSS was designed to allow comparisons between states, and between individual states and the nation. To facilitate comparisons, every state uses a similar method of selecting respondents and the same core questions.

The BRFSS of the SC DHEC was established in September 1985 through a cooperative agreement with the CDC. The primary purpose of the BRFSS is to collect and make available data on selected risk factors by conducting a monthly telephone survey of a representative sample of the state's adult (age 18 and over) population.

**Office of Public Health Statistics and
Information Systems**

The Office of Public Health Statistics and Information Services (PHSIS) consists of three (3) main divisions: The Division of Vital Registry (a population-based registry of all live births, deaths, fetal deaths, marriages, divorces, adoptions, and induced termination of pregnancy occurring in South Carolina); The Division of Cancer Registry (a population based registry of all incidents of cancer in South Carolina); and The

Division of Biostatistics (a statistical, epidemiological, and spatial analytical unit). With these three Divisions, PHSIS contains the core elements needed to carry out the agency's surveillance and assessment responsibilities. The office is also responsible for conducting Internal Review Board oversight on all research conducted by the agency in order to ensure the protection of human subjects involved in research.

Internet Sites for National Diabetes Agencies and Organizations

American Diabetes Association
<http://www.ada.org>
1-800-232-6733

American Association Diabetes Educators
<http://www.aadenet.org>
1-800-383-3633

American Dietetic Association
<http://www.eatright.org>
1-800-877-1600

Juvenile Diabetes Foundation / Kids site
<http://www.jdf.org/kids>

National Certification Board for Diabetes Educators
NCBDE (CDE Exam)
<http://www.applmeapro.com/ncbde>
1-847-228-9795

National Diabetes Educator Initiative
<http://www.ndei.org/>

National Institutes of Health
<http://www.niddk.nih.gov>

National Diabetes Information Clearinghouse
<http://www.niddk.nih.gov/Brochures/NDIC.htm>

Center for Disease Control and Prevention
<http://www.cdc.gov/nccdphp/>

Summary

The preceding list of statewide and local resources for monitoring diabetes prevention and control is part of an ongoing effort to increase awareness and promote interventions that reduce the burden of diabetes. There are active efforts to train health care providers, to educate and encourage persons with diabetes to take control of their diabetes through self-management (dietary changes, exercises, smoking cessation, seeking regular medical care, and performing visual inspections of extremities), and to promote changes in the health care system and the community to improve diabetes outcomes.